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Management Audit of the San Francisco Municipal Railway

Prepared for the
Public Transportation Commission
of the
City and County of San Francisco

In Accordance with the Requirements of
Proposition J (November 1995)

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By the
Budget Analyst
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CITY AND COUNTY OF SAN FRANCISCO

BOARD OF SUPERVISORS

BUDGET ANALYST

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July 11, 1996

Rudolf Nothenberg, President
and Members of the Public Transportation Commission
City and County of San Francisco
949 Presidio Avenue, Room 238
San Francisco, CA 94115

Dear President Nothenberg and Members of the Public Transportation Commission:

Transmitted herewith is our Management Audit of the San Francisco Municipal Railway (MUNI) conducted in accordance with the mandates included in Proposition J, as approved by the voters in November of 1995. The report includes 20 findings which contain 97 recommendations. These findings and recommendations identify opportunities for increasing MUNI revenues and reducing expenditures by $7.8 million annually, and $1.6 million on a one-time basis, net of identifiable costs. Because all of the savings related to the findings contained in this report cannot be fairly estimated, the $7.8 million in annual savings is a conservative estimate. Equally as important, our recommendations would significantly improve the efficiency, effectiveness, and economy of MUNI operations if properly implemented by the Department.

In accordance with Proposition J, funding for this management audit in the amount of $125,000 was approved by the Mayor and the Board of Supervisors. Field work began on January 29, 1996, and the draft report was completed and delivered to MUNI management on June 12, 1996. The Department reviewed the report for factual accuracy during the remainder of the month of June.

The Acting Deputy Director of MUNI Operations left City and County employment in late June, and a replacement Deputy Director was appointed by the Director of Public Transportation. Shortly thereafter, on July 1, the Director of Public

Transportation resigned from the City and County, and a new Director was appointed by the Mayor. Despite these significant changes in MUNI management, an exit conference, was conducted between the Budget Analyst staff and the Department on July 2 in order to discuss the findings and recommendations contained in our draft report and to address any factual concerns which MUNI had regarding our report.

Because the date for delivering the final management audit report to the Public Transportation Commission (PTC) was mandated by Proposition J, the new Director of Public Transportation stated that he could not thoroughly review the draft report content prior to its release. Therefore, the Director decided that he will respond directly to the Public Transportation Commission (PTC) once he familiarizes himself with the findings and recommendations contained in the report. Accordingly, we are unable to comment on areas of the Department's formal agreement and disagreement with the report at this time.

The Public Transportation Commission is now required to conduct "three consecutive months of public hearings to review the findings and recommendations" contained in this report, and to "approve and propose to the Mayor its recommended Action Plan for implementation of audit recommendations and related steps to improve service, safety, and cost-effectiveness." Proposition J further requires that "The Mayor shall approve the Commission's Action Plan, and the Public Transportation Commission, the Municipal Railway Director, the Mayor, and the Board of Supervisors shall use their best efforts to implement the Action Plan."

The FY 1996-97 Budget, as recommended to the Board of Supervisors by the Budget Committee, includes $1,420,488 in reserves, pending consideration of the recommendations contained in this management audit report. During the deliberations on this report by the Public Transportation Commission (PTC) that will follow the public hearings, Budget Analyst staff will maintain a record of PTC decisions regarding its Management Audit Action Plan, and compare the PTC actions with the recommendations contained in this report. We will then develop specific recommendations for the release of reserved funds in the FY 1996-97 budget, and transmit these recommendations for the release of reserved funds to the Board of Supervisors.

Project Scope

The text of Proposition J required that the Budget Analyst conduct a "comprehensive management audit" of the Municipal Railway. However, the amount of funding designated for the management audit in Proposition J was sufficient to fund only a limited scope study for an agency the size and complexity of

MUNI. Accordingly, the Budget Analyst developed a limited scope management audit work plan which was consistent with the Proposition J text. The audit scope was reported to the Board of Supervisors in connection with the supplemental appropriation ordinance approval process. In addition, Budget Analyst staff assigned to our current management audit of the Police Department contributed the section of this report addressing MUNI security.

Proposition J requires that:

> "(c) The audit shall include, but not be limited to the following:
>
> (1) Improved Service and Scheduling
> (2) Increasing Cost Efficiencies
> (3) Selling of Surplus Assets
> (4) Acquisition Plans for New Equipment
> (5) Salaries and Employee Benefits
> (6) Safety of Passengers and Drivers
> (7) Contracting Out Specific Routes"

Our findings and recommendations have been organized according to these specific audit areas so that consistency with the voter initiative is readily apparent.

Department Organization and Cost

The Municipal Railway is a department of the City and County of San Francisco. MUNI is managed by a Director of Public Transportation, who reports to the Mayor through a five member appointed Public Transportation Commission. As part of the City and County, the Municipal Railway's annual operating budget is proposed by the Mayor and authorized by the Board of Supervisors.

In addition to the Director of Public Transportation, the Municipal Railway has one Chief of Staff and four Deputy Directors who manage an authorized staff of approximately 3,570 employees. Included in this total are 1,833 authorized Transit Operator (Driver) positions, which represent approximately 51 percent of the total workforce.

In FY 1995-96, the Department was initially authorized an operating budget of approximately $280 million. Over $206 million, or 73.6 percent of this amount was for salaries and benefits (including temporary salaries and overtime). The balance of approximately $74 million was for contract services provided by private vendors and by other City and County departments, materials and supplies, judgments and claims, and capital outlay. In FY 1996-97, the Department's operating budget has been increased to approximately $285 million.

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San Francisco Municipal

Comparison with Other Transit Properties

As part of this study, we compared the Municipal Railway with other large transit properties within the United States. Based on this comparison, MUNI is clearly one of the most complex and heavily used transit systems in the Country. The following observations, made by analyzing data compiled by the federal government, illustrate this point.

- The Municipal Railway operates four separate modes of transportation (light rail, trolley bus, motor bus and cable car). This is a greater variety than any other transit agency in the Country when regional diesel rail, heavy rail and commuter rail systems are excluded from the comparison.
- The Municipal Railway is the only major transit agency which operates cable cars as part of its general system of transportation services.
- The Municipal Railway is one of only four major transit agencies which operate trolley buses. The others are the Southeastern Pennsylvania Transit Authority (SEPTA), the Massachusetts Bay Transit Authority (MBTA), and the Seattle-Metro Transit Authority. San Francisco operates more trolley buses than the total of the other three transit agencies combined.
- The Municipal Railway operates over 100 light rail vehicles during peak travel periods. This is second only to MBTA, which operates 177 light rail vehicles during peak travel periods.
- The Municipal Railway provides the greatest average number of motor bus passenger trips per hour of service of any major transit agency in the Country.
- Second only to SEPTA, the Municipal Railway provides the greatest average number of trolley bus passenger trips per hour of service of any major transit agency in the Country.
- The Municipal Railway provides the third greatest average number of light rail passenger trips per hour of service of any major transit agency in the Country. Only MBTA and SEPTA provide a greater number of light rail trips per hour.

In addition, MUNI faces other challenges that are uncommon for transit agencies within the United States. Services are provided in a compact geographic area, on narrow streets which are heavily congested with automobile traffic during peak hours of service. Motor and trolley buses must navigate steep hills, and maneuver through tight intersections in many locations within the City. Although not faced with winter snow and cold, as are some properties in the middle and eastern sections of the Country, in many respects the physical characteristics of San Francisco make transit services equally difficult to provide.

Broad Conclusions Regarding MUNI Operations

Based on our review of reports produced by MUNI and external review agencies, as well as additional analysis conducted by Budget Analyst staff, we have drawn the following broad conclusions regarding the operations of MUNI:

1. The Municipal Railway's budget has increased at a rate below inflation during the past five years. As a result, MUNI's absolute budget has decreased during this period when adjusted for inflation.

2. MUNI has assumed responsibility for certain administrative and support functions which previously had been provided by the Public Utilities Commission (PUC) prior to 1994. The additional operating burden placed on MUNI from the assumption of these underfunded functional transfers has severely impacted the department's ability to provide reliable service to the San Francisco community.

3. The service impacts from budget reductions and the loss of PUC support has been exacerbated by an aging vehicle fleet that requires increased maintenance and repair effort to operate.

4. Many of the Municipal Railway's facilities are aging and are not designed to accommodate the new equipment that is being purchased by the Department. The difficulties presented by facility condition will impact MUNI's future ability to provide reliable services.

5. The City and County has not implemented formal service reductions that will allow MUNI to efficiently operate within funding levels authorized by the Mayor and the Board of Supervisors.

These general conclusions are discussed in more detail within the body of this report. Our detailed recommendations, included at the end of each finding, provide many specific steps that MUNI should take to improve service and increase efficiency. However, we believe that unless the City and County either seriously considers targeted service reductions, or identifies additional sources of revenue to supplement current levels of General Fund support, MUNI service quality will continue to deteriorate.

Recent Efforts to Improve the Cost Effectiveness of MUNI Services

This report presents a critical evaluation of MUNI operations, appropriately identifying problem areas within the organization in order to provide recommendations for corrective action. Because of the critical nature of this study and of management audits in general, we believe it is appropriate to recognize the Public Transportation Department's efforts to stabilize and improve MUNI operations.

Accordingly, this section provides summary descriptions of some of MUNI's most noted accomplishments. For example, MUNI has:

- Reorganized in 1995-96 by creating the Office of the Director, which consolidates the various functions that support the Director and the Public Transportation Commission. This is a positive step toward enhancing the support given to City and County decision-makers, and improving communications with the public and employees.
- Developed and implemented a comprehensive data collection plan devised to produce line level ridership data for internal planning purposes, scheduling, and federal Section 15 ridership reporting.
- Developed and sought approval for a Comprehensive Integrated Safety and Loss Prevention Program which is intended to reduce the incidence of worker injury and accompanying Workers Compensation Cost. Such a program is critical for protecting workers and the public, and for reducing the costs of Workers Compensation.
- Transferred capital grants staff from the Finance Division to the Capital Projects Division to improve coordination between capital financial staff and project managers.
- Successfully implemented a substance abuse testing program required by the federal Omnibus Transportation Employee Testing Act of 1991. Although we did not have sufficient time to conduct a detailed review of the program as part of this management audit, the reported design of the program and the Department's success with achieving compliance with federal law appears commendable.
- Successfully implemented a Graffiti Prevention program which has substantially improved the appearance of MUNI vehicles. Although vandalism continues (e.g., broken windows), the success of this campaign has been significant.

Under the guidance of the Public Transportation Commission, MUNI is making an effort to more effectively identify operating problems and implement changes to its system that will improve services and reduce costs. Each of these examples demonstrate instances where Department initiatives have resulted in positive change. The challenge for the Department is to continue with such efforts in an operating environment characterized by diminishing resources. Our findings and recommendations, which focus on practical steps that should assist MUNI in providing services more successfully, are summarized below.

1.1 Organization and Management

The Municipal Railway's direct service activities are presently organized by the principal functions of Operations and Maintenance, with management and support activities performed by the Director's Office, Capital Programs, and Finance, Administration and Personnel. This organizational structure creates a system of management by specialty, but reduces accountability by service or product line (e.g., diesel, trolley, light rail, and cable car services).

Other large transit properties with multiple vehicle modes are organized according to general service. This organizational structure fosters management accountability while retaining suitable levels of technical specialty within the organization.

The Department and the Public Transportation Commission should consider alternative organizational structures for the Municipal Railway in order to increase management accountability, responsibility, and timeliness of decision making over major service modes.

The Public Transportation Commission should:

1.1.1 Schedule and conduct a series of workshops to examine the organizational structure of the Department of Transportation. This examination should incorporate the organizational concepts employed by other major transit properties, with the goal of improving customer service with more focused management authority, responsibility, and accountability over operations and light maintenance activities.

Although there would be no new cost to implement this recommendation, the benefits from reorganizing the Municipal Railway could be significant in terms of customer service, efficiency, and cost savings. The amount of such savings cannot be quantified until specific organizational alternatives are developed by the Public Transportation Commission, and the results of meet and confer sessions with employee bargaining units are known.

1.2 Transit Operator Scheduling

The Municipal Railway has not developed a program to effectively manage transit operator staff. Position control is fragmented and weak, sick leave and workers compensation use is high, and the assignment of operators to non-driving duties is excessive. As a result, MUNI operators are required to work extended shifts, resulting in the scheduling of excessive non-productive hours and a high use of overtime.

For example, in FY 1995-96, scheduled overtime totaled approximately $10.0 million annually, or 11.92 percent of current platform operator salary expenditures. This scheduled overtime includes all platform operator pay which is built into individual runs, paid at a premium time and one-half rate. An additional $7.4 million, or 8.4 percent of expenditures, is currently paid for unscheduled overtime for platform operators. This unscheduled overtime is required to cover scheduled runs when regularly scheduled operators are in training or on leave. In total, over 20 percent of Platform Operator salary expenditures are for overtime.

MUNI also employs many more operators than are authorized by the Board of Supervisors, agreed to in the Memorandum of Understanding with Transit Workers Union Local 250A, or agreed to by the Mayor and the Controller to replace employees on long-term industrial injury leave. During the period of our study, the Department employed 138 Platform Operators more than are authorized in the Annual Salary Ordinance.

Despite this "over-employment" of personnel, the Department is still unable to meet its vehicle scheduling needs with regularly scheduled personnel, resulting in the use of excessive overtime (averaging over 20 percent of all paid time in FY 1995-96) and lost service. In the first half of FY 1995-96, over 15,000 hours of service were missed due to "No Operator." This equates to a rate of 6.9 percent of all service, or more than 30,000 hours of missed service per year. This occurs, primarily, due to the number of operators on extended leave, in light duty status, or assigned to non-driving special duties. The actual number of operators available for sign-up is currently less than the 1,780 required for optimal scheduling, even though the Department employs over 2,240 full-time and part-time platform operators.

By implementing an effective position control system and increasing the number of full-time and part-time operators who are physically able and available to drive, the Municipal Railway could reduce platform hour requirements, increase service reliability, and save approximately $1.1 million per year.

Therefore, the Director of Public Transportation should:

1.2.1 Develop a proposal to purchase or develop a centralized personnel information system for maintaining all employee information. This system should include a position control element.

1.2.2 Request a supplemental appropriation to provide funding for the implementation of the proposed centralized personnel information system.

1.2.3 Develop historical averages of the number of operators who are unavailable for driving due to extended leave and other factors.

1.2.4 Implement detailed recommendations in Section 2.1 of this report to reduce the number of operators assigned to non-driving special duties.

1.2.5 Provide the Public Transportation Commission with a quarterly list of operators assigned to non-driving duties, their assignment, and the reason the assignment is of a higher priority than driving.

1.2.6 Seek approval and funding for the Integrated Safety and Loss Prevention Program developed by the Department in March 1996.

1.2.7 Report to the Public Transportation Commission quarterly regarding the number of employees unavailable for driving duties due to sick and industrial leave status.

1.2.8 After implementing recommendations 1.2.1 through 1.2.7, above, request an amendment to the City's Annual Salary Ordinance to increase the number of full time operator positions to correspond with actual practice.

1.2.9 Increase the number of part-time platform operators to the 220 maximum allowed by the present MOU as soon as sufficient operators complete the necessary training.

Implementation of the Integrated Safety and Loss Prevention Program, as proposed by the Department, would result in annual costs of approximately $1.3 million per year. However, these costs will be offset by reductions in the cost of Workers Compensation claims and increased scheduling efficiencies described in this finding.

The cost of a computerized position control system is unknown at this time. However, such a system would be cost effective if it is microcomputer or minicomputer based, reduces the need for duplicative data entry and record management, and improves management's ability to control operator costs.

By consolidating platform operator personnel records into a centralized position control system, MUNI would have more accurate information on the status of each individual operator and the total number of operators available for sign-up. Implementing an effective position control system would also provide MUNI management with improved information for use in developing and monitoring the budget to insure that salary accounts are not over-expended.

By implementing all of the recommendations contained in this Section, the Municipal Railway can reduce its platform hour requirement, resulting in reduced costs estimated to be $1.1 million annually.

1.3 LRV Second Operators

The Municipal Railway currently schedules platform operators for duty in all Light Rail Vehicle (LRV) cars that are placed into passenger service. Scheduling operators in the second, third and fourth cars of multiple LRV trains is an inefficient use of staff resources.

Implementing a Proof-of-Payment Program (with the addition of 37 positions at an annual cost of between $1,324,178 and $1,591,181) would result in increased efficiencies, more expeditious passenger boarding, and net annual savings of as much as $2.1 million.

The Director of Public Transportation, and other appropriate City and County managers, should:

1.3.1 Meet and confer with the Transport Workers Union, Local 250A, regarding the implementation of a full Proof -of-Payment Program.

1.3.2 Request a supplemental appropriation for 37 positions, costing between $1,324,178 and $1,591,181, which would provide funding for the implementation of a Proof-of-Payment Program.

1.3.3 Request amendments to the City's Annual Salary Ordinance which would provide authorization to staff the Proof-of-Payment Program.

1.3.4 Reassign operators from duty on the second, third, and fourth cars of multiple LRV trains to active driving assignments, to improve MUNI's ability to meet scheduled service requirements.

Implementation of a Proof-of-Payment Program would result in more expeditious boarding of passengers, and a net savings estimated to be as much as $2.1 million annually.

1.4 Transit Service Supervision

The number of budgeted fixed post and mobile transit supervisor positions has steadily decreased from a high of 95 in FY 1981-82 to 64 in FY 1995-96. Yet the need for street supervision to sustain schedule adherence is apparent.

During random corner checks performed by our study team, we found that only 62 percent of MUNI vehicles adhere to their published schedules, as compared with a service goal of 85 percent established by the Department. We also observed that the time between service could be doubled at specific stops if coaches ran late or early.

For example, the "headways" on Line Number 2 Clement are 15 minutes on the day when we conducted our observations. On one observation, Run No. 686, which had a scheduled outbound time of 2:45 PM, had an actual outbound time of 2:40 PM. The next run on Line 2 Clement, Run No. 703, was running fifteen minutes late, probably due at least in part to the effects of having to pick up the passengers that missed Run No. 686. Thus, a transit passenger arriving at the Fillmore/Sutter outbound stop to catch Run No. 686 at 2:45, just prior to that time, would have had to wait until 3:15 (over one half hour) to board Run No. 703.

On that same day, we observed that Run No. 707 was running late by eighteen minutes, arriving at the Fillmore/Sutter intersection at 2:56 PM. Run No. 623, which is Run No. 707's "follower," was running late by only four minutes and thus arrived at the Fillmore/Sutter intersection at 2:57 PM, one minute behind its "leader." Since the next inbound run, Run No. 700 was not dispatched due to the unavailability of an operator, there was a period of 30 minutes between Run No. 623 and Run No. 662, the next inbound coach on Line No. 2.

Another indication of poor line management is when transit vehicles on the same line run in very close proximity to one other, not maintaining scheduled headways. For example, we observed three coaches on the 21 Hayes Line running in tandem on Wednesday, April 24, 1996, at 2:26 P.M., at the intersection of Hayes and Gough Streets. Two of the coaches were in the bus stop zone simultaneously and the third was across the intersection waiting for a green light, the first vehicle in its lane. We checked with Central Control and determined that there had been no activity reported that qualified for an entry in the daily log.

We also found that approximately eight percent of motor coaches pull-in to the yards prior to their last scheduled passenger service stop (node). Based on two random observations, we found that approximately 31.6 percent of the pull-in-times observed at the Flynn and Kirkland diesel bus yards were four or more minutes ahead of schedule. In fact, approximately eight percent of the coaches arrived well before the last scheduled passenger stop for the run.

Five coaches out of 56 coaches observed at the Flynn Motor Coach Division arrived from nine minutes to 29 minutes prior to the last scheduled passenger stop on their assigned runs (8.9 percent of all observed pull-ins). Similarly, six out of 75 coaches observed at the Kirkland Motor Coach Division arrived prior to the last scheduled service stop on their assigned runs (8.0 percent of all observed pull-ins). The practice of "cutting runs short" to leave work early is one which is reportedly common, based on interviews conducted during this study.

We interviewed many Transit Service Inspectors. In general, the morale of those with whom we talked is very low, particularly among those who have been employees of MUNI for many years. The inspectors we interviewed discussed their feelings that many employees now take advantage of "quirks" in MUNI's rules to manipulate the system to their advantage. They believe some operators abuse Workers Compensation rules by making inappropriate or fraudulent claims; and avoid work, as evidenced by records of high numbers of miss-outs, claims that equipment is faulty as an excuse to return to the yard before the scheduled end of their runs, and operate coaches as "out-of-service" when required to be in-service. Some of the Transit Service Inspectors we interviewed stated that because of these perceived abuses, they are no longer enthused about their roles in the organization.

By increasing the number of transit supervisors, adjusting transit schedules to conform with operator and equipment resources, and by regularly employing random line supervision techniques, MUNI can enhance transit services and schedule adherence.

Recommendations

The Mayor and the Board of Supervisors should:

1.4.1 Approve the Public Transportation Commission's request for an additional 12 Transit Service Supervisor positions for FY 1996-97 (these 12 positions are included in the Department's FY 1996-97 Budget).

The Public Transportation Commission should:

1.4.2 Direct the Director of Public Transportation to develop an efficient methodology for evaluating and reporting on the reliability of current transit services.

1.4.3 Direct the Director of Public Transportation to develop and report on a deployment plan for the Transit Service Supervision Unit. This plan should maximize inspector effectiveness by rotating some inspectors to random locations based on periodic assessments of schedule adherence. Until the results of this deployment strategy are known, other supervisor positions (including the Transit Manager I positions included in the FY 1996-97 Recommended Budget), should not be authorized.

The cost of adding 12 Transit Service Supervisor positions to provide increased field supervision would be $839,768 annually, at the top step including fringe benefits (included in the FY 1996-97 Approved Budget). However, the addition and effective deployment of these personnel would improve the quality and timeliness of current services.

1.5 MUNI Metro Tunnel Station Agents

Six of the nine MUNI metro tunnel stations have two fare gate entry booths. The MUNI Metro Station Operations Unit attempts to staff the secondary booths, depending on the station and booth location, for up to 15 hours per day during weekdays and 10.5 hours per day on weekends.

Secondary booth coverage is most critical at the Powell, Civic Center, and Montgomery stations, due to high levels of use and the remoteness of the secondary booths from the primary booths. However, even those three secondary booths are often not staffed, resulting in public inconveniences, revenue loss, and equipment vandalism.

For example, according to MUNI's records the cost of labor and materials to repair fare gates in calendar year 1995 was $26,600. That figure does not include approximately 23 coin canisters which were stolen and which cost $829 each, or an additional $19,067. These costs also do not include revenue stolen from the coin canisters, which cannot be estimated. Additionally, the Department's Revenue Manager cannot provide an estimate of revenue losses which occur due to the misuse of discount passes, fare gate intrusions, other canister thefts, and illegal entries. However, we believe that the total figure would be far in excess of the $45,667 in identified costs per year.

By staffing the Metro Station Operations Unit at its authorized strength, by better controlling absences, and by investigating the costs and benefits associated with installing electronic surveillance equipment at all booth locations, adequate service and security would be better accomplished.

The Director of Public Transportation should:

1.5.1 Direct MUNI Metro Station Operations management to develop a plan for reducing absenteeism, and to closely monitor and manage staff absences in order to achieve at least 80 percent of paid time on the job.

1.5.2 Staff the MUNI Metro Station Operations Unit at its authorized strength of 57 full-time positions, using existing resources authorized for the Department.

1.5.3 After regular full staffing has been achieved, investigate and report back to the Public Transportation Commission on the costs and benefits of installing electronic monitoring equipment at all of the station booths, taking into consideration the full benefits from more consistent staffing of the primary and secondary booths.

1.5.4 Request that the Department of Human Resources survey and classify the top management position in the MUNI Metro Station Operations Unit to determine whether it would be more appropriately staffed at the Transit Manager I level.

1.5.5 Conduct a study of the Metro Stations and report to the Public Transportation Commission on steps that can be taken at minor cost to improve operational and working conditions, and on those working and operational condition improvements that may require significant funding through a capital project.

There would be no additional costs to implement these recommendations.

By staffing the Metro Station Operations Unit at its authorized strength, by better controlling absences, and by investigating the costs and benefits associated with installing electronic surveillance equipment at all booth locations, adequate service and security would be better accomplished.

1.6 Maintenance Management Controls

Many Management controls and processes in MUNI's maintenance division are weak and need improvement.

For example, we observed persons asleep during the graveyard shift at the cable car barn, which at the same time was left unsecured and unattended by employees. Specifically, during an unannounced visit to the Cable Car Barn at 3:30 AM, we observed that the Mason and Washington Street garage doors were left open and unguarded. We entered the facility and walked through each area unapproached by MUNI employees. There were no employees in attendance at the control room on the first floor; and, there were no employees present on the second floor where 39 Cable Cars are stored. Although approximately one-half hour was spent inspecting individual Cable Cars, no MUNI maintenance personnel made their presence known.

While inspecting the Cable Cars, we observed that several private vehicles were parked in unauthorized parking areas and one of these vehicles contained an individual who was sleeping.[1] After completing a separate visit to the Operations Division on the second floor mezzanine and completing appropriate verification of our visit, we exited through the open barn door at Washington Street, unnoticed.

We believe that this represents a serious breach of security at a City facility and particularly at one that houses a local and national treasure such as the San Francisco Cable Cars. Five maintenance employees are assigned to work on the graveyard shift at the Cable Car Barn, so there should be sufficient staff to monitor the security of such valuable assets. If maintenance employees are called away for an emergency, the barn door should be locked and the facilities made secure.

In addition, quality control and monitoring of road calls associated with disabled revenue vehicles is weak. One road call which we observed was initially described as a "damaged tire" on a diesel bus disabled at 41st Street and Sloat Boulevard in the Sunset District. The auto service worker who provided the replacement bus could not find any impairment to the tire in the field. Despite the reported damaged tire, the mechanic returned the disabled bus to the Woods maintenance yard at speeds of up to 60 miles per hour on Interstate 280.

Further, employee evaluations are consistently not performed so supervisors lose control of effective and consistent management oversight of their assigned employees. Site supervision can also be weak. For instance, at all facilities, assigned employees are often difficult to locate. After several rounds through the Flynn Articulated Motor Coach Yard during the hours between 7:00 PM and 10:00 PM, we did not observe any mechanics working on coaches parked in the maintenance bays. At the Woods facility, maintenance employees had only a minimum amount of work underway at the time of our arrival at 3:30 AM, over one half hour into their shift. When our presence became known, these workers dispersed to areas of the yard where they could not be observed. We could not determine whether these individuals were working when we left the facility because none were observed working on coaches in the maintenance bays.

Lastly, the Maintenance Division has yet to develop a set of operating standards in order to create a measure of effective labor utilization. For example, two maintenance controllers were on duty at the Woods Yard during our visit, and we observed the work they perform. That work included coordinating road calls, entering vehicle repair data into the computerized Vehicle Maintenance System (VMS) and working with the swing and graveyard superintendents to assign repair and service activities to workers. We later analyzed the work product of the controllers assigned to this shift, including the monthly data reports on the hourly distribution of road call activities. Based on our observations and this review of workload, we believe that the controller function at the Woods Yard can be accomplished by one rather than two controllers between the hours of 11:00 PM and 6:00 AM.

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[1] During interviews with Maintenance Division personnel, we were advised that graveyard shift maintenance staff at the Cable Car Barn often sleep during the period after the system is shut down and before the system is restarted in the morning. We could not verify this assertion. The Department indicates that the individual found sleeping during our observation was an off-duty platform operator who was napping prior to his drive home. We confirmed that the vehicle belonged to a Cable Car operator who resides in Sacramento.

Therefore, the Director of the Public Transportation should:

1.6.1 Implement management standards throughout the organization that (1) guarantee adherence to basic employee expectations for job conduct and performance, and, (2) establish a procedure that makes managers accountable for the implementation of these standards and quality assurance measures. The protection of city assets is a major standard that should be immediately addressed;

1.6.2 Reduce the number of graveyard maintenance controllers from two to one at the Woods Facility to reflect the actual level of work required during this shift;

1.6.3 Instruct Field Operations Central Control to advise maintenance dispatchers on the direction as well as the location of disabled vehicles in order to minimize the time needed for the scheduled run to be out of service;

1.6.4 Implement a *one coach-one driver* policy that would improve respect for equipment and worker accountability, and would foster relationships between operators and mechanics regarding the maintenance and care of individual vehicles;

1.6.5 Require annual performance appraisals by requiring accountability of each division for the timely performance of all employee evaluations. The MUNI Personnel Unit should also be accountable to provide a more concerted effort to assure that all evaluations are completed on time.

The Deputy Director of Maintenance should:

1.6.6 Direct supervisors and controllers to implement quality control procedures and practices that will reduce questionable road call incidents by an estimated ten percent;

1.6.7 Implement the installation of electronic hub odometers to the front wheel of the 500 diesel buses in the current fleet in order to clock the accurate time that revenue vehicles complete their schedule runs;

1.6.8 Develop and adopt time goals or operating standards for as many maintenance activities as practical. The development of guidelines should be undertaken jointly by management and labor personnel in accordance with existing labor Memoranda of Understanding. The time estimates should be used as guidelines, not as strict standards. Their purpose should be to track mechanic productivity and to identify exceptions or deviations from expected output. Major deviations should be investigated and acted upon accordingly, when not justified.

Implementation of improved management controls would enhance maintenance supervision and productivity. Because the City Cable Car fleet is a major City asset as well as a national treasure, their protection and safety should be one of MUNI's highest priorities.

Quality assurance provisions for road calls that dispatch assistance to disabled vehicles during scheduled runs should be implemented to reduce the number of unnecessary requests for road assistance. We estimate that road calls could be reduced by 10 percent which would allow Auto Service Workers to be reassigned to other maintenance duties. The deletion of one maintenance controller from the graveyard shift would save an estimated $73,500 annually. In addition, MUNI should expand the scope of installing electronic hub odometers to its 500 diesel bus fleet at an estimated one-time cost of $108,000 which could be paid from the savings in labor costs of a maintenance controller over a two year period. These devises would keep track of the time vehicles return after completing a designated run, which further make operators accountable for their time.

Annual staff evaluations permit managers and employees to assess areas for improvement and to identify areas in which additional training is needed. The development of work standards would allow MUNI to objectively evaluate the productivity of its maintenance workers. In turn, the maintenance workers would know what is considered an acceptable and fair level of performance.

1.7 Maintenance Engineering

Engineering staff assigned to the maintenance division has been reduced from earlier levels due to budget reductions. This reduction in engineering staff has resulted in a number of technical shortcomings, including: (1) no in-house analysis of alternate products and services including the re-engineering of parts, (2) minimal expertise to develop alternative repair solutions that would correct repeated breakdowns to the revenue fleet, (3) the lack of maintenance standards that would provide managers with staff performance indicators and, (4) weak in-house engineering support for facility design and renovation.

For example, several costly design flaws occurred during the renovation projects for the Potrero Division Trolley Coach Division and the Flynn Center Diesel Division. In one instance, a three post lift was designed and constructed along interior track No. 20 to raise the new 60 foot electrical articulated coaches. The construction of this lift was too close to a bearing wall and to an electrical circuit conjunction box for the lift to be operational. Although the work is completed, the lift has never been used.

To overcome these types of shortcomings, the Public Transportation Department should dedicate three engineers to the Maintenance Division, one to each of the primary vehicle modes: LRV, Diesel, and Trolley divisions. These engineers would provide technical assistance and support for major vehicle overhauls, the review of specifications and evaluation of bids from outside vendors, analysis of alternate products and services, the development of solutions to design deficiencies, the preparation of work standards and practices, and coordination with existing Capital Projects engineers on the design and renovation of facilities.

Cost savings from implementing these recommendations would be at least $450,000 per year. After factoring-in the cost for additional staff of $226,700 per year, the net annual savings would be $223,300.

The Director of Public Transportation should:

1.7.1 Modify the Department's budget request and assign three engineering positions, (one new senior mechanical engineer and two new electrical engineers) to the primary vehicle modes: LRV, Diesel and Electric Trolley Coach Divisions. These engineers would also consult with existing engineers assigned to the Capital Projects Division on facility design and renovation.

1.7.2 Assign the engineers to supervise the work of the Technical Services Units, in consultation with unit supervisors, senior controllers, materials managers and maintenance trainers, to solve immediate problems, develop alternative repair and maintenance solutions, and provide quality assurance to maintenance procedures and standards.

The additional three engineers would cost $226,700 annually. This cost would be offset by an estimated $450,000 through savings in design enhancements, improved parts from in-house fabrication, the preparation of more detailed specifications to vendors, and the preparation of work standards to improve work practices. This would result in a net annual savings of $223,300 during the first year of implementation.

2.1 Special Duty Operators

The Municipal Railway has assigned Transit Operators to non-driving duties for many years to provide various clerical, administrative, and support services in the Department. The employees who are placed on these non-driving assignments are termed "Special Duty Operators", or SDOs.

Presently, 53 operators are assigned on a full-time, regular basis to non-driving SDO duties. Further, based on a review of sample pay periods conducted as part of this study, the equivalent of an additional 35.2 FTE operators are assigned to SDO duties on a part-time or intermittent basis.

As a result, as many as 88.2 FTE operators are diverted from normal driving duties even though MUNI is regularly unable to dispatch scheduled service due to a lack of available operators. This practice is costly. For example, some permanent Special Duty Operators sign on to regular transit runs and are paid on the basis of that transit run, which can range for anywhere between straight pay for eight hours to straight pay for eight hours plus overtime for up to 2 hours, even though they do not drive a bus, but are performing clerical and administrative work.

The Deputy General Superintendent of Division Operations states that, with the exception of one operator who gets paid for time actually worked, Special Duty Operators working in the Headquarters generally work eight hours per day, but are paid for one additional hour of overtime in order to "compensate them for the reduction in pay they would otherwise suffer when compared to the run pay they would receive as a transit operator, which often includes overtime." In other words, some MUNI employees are being paid for time not worked, which is an improper practice and which should be terminated immediately. The cost of this practice is approximately $278.70 per day, or $66,888 in unearned overtime compensation per year for the ten special duty operators who are on this pay arrangement at Headquarters. Our examination of the Department's pay and operational records reveals that some operators who are being paid on the basis of transit runs *do not* operate transit vehicles at all. Others operate transit vehicles only periodically, while some operate transit vehicles on a daily part-time basis. This practice is also in violation of the current MOU with TWU Local 250A, and is inconsistent with the budget policy established by the Mayor and the Board of Supervisors.

As an example of how this practice impacts service, on the morning of April 5, 1996, the Potrero Division reported a total of 10 transit line runs which were not dispatched because an operator was not available. However, the Potrero Division uses 13 transit operators as non-driving SDOs on a full time basis. Had these operators been available to operate a transit vehicle, the number of missed runs due to the unavailability of operators could have been reduced, if not entirely eliminated.

Department-wide, the salaries and benefits for platform operators assigned to special duty equates to approximately $4.9 million per year, much of which represents a loss of service or is backfilled with scheduled overtime. By eliminating this practice, except for operators who fulfill specific union roles or are on temporary light duty status, transit service reliability could be improved and operating costs could be reduced.

The Director of Public Transportation should:

2.1.1 Issue a directive to all MUNI managers to immediately discontinue the use of Special Duty Operators, except for light duty and the ten positions permitted by the MOU with TWU Local 250A.

2.1.2 Discontinue the practice of paying overtime to Special Duty Operators in MUNI Headquarters, for time not actually worked.

2.1.3 Discontinue the practice of permitting full-time, regular Special Duty Operators to sign-up for transit runs, or be compensated on the basis of transit run pay.

2.1.4 Discontinue the practice of permitting paid, excused absences.

There will be no cost to implement these recommendations.

A precise estimate of potential savings cannot be calculated due to limitations in the scope of this management audit. However, we believe that by eliminating the practice of making excessive SDO assignments, transit service reliability could be improved, and operating costs related to the $4.9 million in SDO salaries could be reduced by several hundred thousand dollars per year.

2.2 Special Duty Maintenance Workers

The Maintenance Division has had as many as 22 employees reassigned to special duties. These administrative transfers, along with 74 budgeted positions kept vacant to achieve a seven percent salary savings, have decreased MUNI's capability to meet its repair and maintenance needs.

As of April 1996, 11 of the 22 employees have been transferred back to their originally assigned duties. An additional three employees should be restored to their previous duties, to bring the total number to 14 employees, costing $844,300 per year.

MUNI has requested $459,335 in its 1996-97 budget request to fill 11 vacant positions, which would reduce the Department's current salary savings from 7.0 to 6.3 percent. Before reducing its salary savings and hiring additional employees, MUNI should evaluate the impact from (1) restoring the 14 employees to their previous duties, (2) hiring 21 employees in newly approved positions, and (3) filling up to 26 vacant positions not affected by current salary savings requirements which in total are estimated to cost $3.2 million annually in labor costs.

The Director of the Public Transportation Department should:

2.2.1 Restore three positions (1426-Senior Clerk Typist, 1844-Senior Management Assistant and 7379 Electrical Transit Mechanics) to the Maintenance Division as identified in Table 2.2.3 of this report.

The Board of Supervisors should:

2.2.2 Continue to reserve $459,335 in salary savings reductions until MUNI management provides a report on the impact of restoring 14 employees to line duties, hiring up to 26 vacant positions not subject to the seven percent salary savings, and hiring 21 new positions in the Maintenance Division; and a report on how the additional positions will fulfill vitally needed maintenance work.

The Department of Human Resources should:

2.2.3 Review the status of eight positions [(6) 7379 Electrical Transit mechanics, (1) 7380 Electrical Transit Mechanic, and (1) 7409 Electrical Transit Service Worker] to determine the appropriate classifications associated with performing work out of the current classification.

Evaluation of the 14 restored positions to the Maintenance Division may be sufficient to fulfill additional needed maintenance work for MUNI's purposes and thus avoid adding positions estimated to cost $459,335 per year.

2.3 Fuel Waste, Engine Wear, and Air Pollution

Although diesel bus manufacturers and MUNI policy recommend starting diesel buses only 15 minutes before early morning pull-out, maintenance service workers routinely start diesel buses at 2:30 AM at the Kirkland and Woods yards.

Thus, 262 diesel bus motors idle for at least two and one-half hours and as much as four and one-half hours until they are placed into service between 5:00 AM and 7:00 AM. This practice wastes fuel, pollutes the air, and adds unnecessary wear to the diesel engines.

By correcting this practice, MUNI would save an estimated $670,000 annually in lost fuel and diesel engine repair costs. In addition, MUNI would reduce air pollution generated by the diesel buses, which for one weekday is the equivalent of idling nearly 56,000 passenger vehicles for one hour.

The Director of Public Transportation should:

2.3.1 Direct Maintenance Division staff to comply with MUNI's own policy, as well as with the recommendations of diesel engine manufacturers, regarding the start-up of diesel buses, which require that the engines be started only 15 minutes before early morning pull-out.

The Mayor and the Board of Supervisors should:

2.3.2 Add two additional auto service workers to assist with the starting of the diesel buses, one each at Woods and at Kirkland Bus Yards.

Unnecessary fuel usage and engine wear and tear will be substantially reduced for an estimated savings of $670,000 annually. Air pollution emission of nitrogen oxide equal to the idling of nearly 56,000 passenger vehicles will be eliminated, thus improving the general air quality for the San Francisco Bay Area.

2.4 Purchasing Parts and Equipment

MUNI currently has 24,350 vehicle parts valued at approximately $23.5 million which are stored at nine different maintenance locations in the City. In 1995, automated inventories at the nine storeroom sites had an unrecorded variance of $1.43 million, which was 6.6 percent of the total inventory value of $21.6 million (during the last six months, inventory values have increased $1.9 million from $21.6 to $23.5 million). This $1.43 million inventory variance includes a positive adjustment of $605,406 and a negative adjustment of $828,229. Thus, $828,229 in inventoried parts are either missing or not properly accounted for, and $605,406 in parts are actually in stock but not recorded in the automated inventory records.

MUNI needs to implement stricter security measures that will protect their assets and/or mistakes in recording inventoried parts. Although MUNI has requested seven additional parts storekeepers, three would be sufficient to facilitate expanded maintenance swing and weekend shifts.

Further, Materials Management staff should review current practices to identify more competitive prices or opportunities to fabricate parts in-house. For example, a review of the existing wheelchair lift overhaul operations found that repairs could be done at less cost either by purchasing less expensive parts or by fabricating parts in-house. Potential savings with the overhaul and repair of 280 wheelchair lifts could be substantial but are unknown until Materials Management completes a full review of the alternative purchasing options.

In addition, 20 new diesel engines were purchased over two years ago, but never installed. Because the total cost may exceed $2.3 million, the Public Transportation Department should consider selling the engines and implementing an alternate program of engine repair that would save an estimated $1.1 million.

The Public Transportation Department should:

2.4.1 Expand data collection on parts to include information on all purchases and parts that are fabricated by MUNI personnel;

2.4.2 Research other computer based materials inventory systems that will require less labor intensive data entry requirements than the current Materials Management System and provide easier access and integration of all parts information with data maintained for the repair and maintenance of transit vehicles;

2.4.3 Introduce bar coding of parts into an improved materials inventory system in order to facilitate the tracking of information on the repair of individual transit vehicles;

2.4.4 Implement tighter security measures for parts storeroom access in order to control unauthorized entries by non-storeroom personnel;

2.4.5 Increase the number of hours that parts storerooms are open for the issuing of parts to maintenance personnel. We have recommended an additional three parts storekeeping positions so that storerooms are open between 6 AM and 7 PM on weekdays, and between 8 AM and 5 PM on weekends. These expanded hours should facilitate the additional needs associated with the expanded maintenance hours.

2.4.6 Modify procedures so that entries to the storeroom during times when parts storekeepers are not on duty should be limited to and be the responsibility of the night and weekend supervisors.

2.4.7 Provide for continuous review of existing vendor contracts to assure that MUNI is obtaining the best prices and to determine if other opportunities, such as in-house fabrication of parts, might be a more economical alternative.

The Mayor should:

2.4.8 Direct the Purchaser to relocate five MUNI dedicated purchasing staff to MUNI's Materials Management centralized operation at Pier 80. This would comply with the recently passed Proposition M, which mandated the separation of MUNI functions from the Public Utilities Commission.

Increased parts storeroom security and adherence to storeroom procedures will decrease the risk of the loss of assets and mistakes in the proper recording of parts issued and received.

The adding of parts storekeepers will provide sufficient staff to fill swing shift and weekend shift parts issuing functions at the yards. Our recommendation of three additional parts storekeepers would reduce MUNI cost to hire seven additional parts storekeepers by $178,370.

The review of current vendor contracts would provide for opportunities that would result in savings. Two examples noted in this section identified potential savings with the overhaul and repair of wheelchair lifts, and $1.1 million with an alternate proposal to repower 20 diesel buses.

2.5 Farebox Revenue Collection & Control

Fifty-two percent of the incidents written up in the Revenue Division's "Unusual Occurrence" reports relate to situations where staff did not follow procedures or procedures were obsolete. By making procedural, operational, and physical work environment improvements, MUNI could increase productivity and accountability of staff in this division.

For example, MUNI is foregoing approximately $36,860 annually in unearned interest as a result of being, on average, three days behind in processing and depositing fare revenue. This is in violation of City Charter Section 6.311 that mandates all moneys and checks received by any officer or employee of the City and County shall be paid or delivered into the treasury not later than the next business day after its receipt. Furthermore, the late deposit of revenue, which is in the form of currency, jeopardizes the safety of City employees and the security of the revenue.

General procedures manuals for the Municipal Railway's Revenue Division, including the Collection, Reconciliation, and Processing Units, have not been updated in the last 10 years. Accordingly, current procedures are incomplete and some are obsolete. In some cases, when procedures do exist and are either formally or informally communicated to staff, enforcement by management and supervisors should be strengthened.

MUNI also has not established adequate procedures for staff to safely retrieve and transport revenue from Cable Car pass collection sites to headquarters. Specifically, during the PM pickup of revenue at the Powell/Market location, Division staff and a contract security guard are required to carry revenue from the ticket booth to the transport vehicle, which is often parked one to two blocks away from the booth. MUNI does not have a permanent parking spot designated in that location, often forcing staff to park blocks away. (MUNI has even been cited and towed by the City for parking the revenue van on Market Street when retrieving revenue). This situation puts personnel and revenue at risk.

With a full staff of nine fare collection receivers, MUNI's Processing Unit should be able to process its assigned revenue. However, this unit has a high absenteeism rate. During January of 1996, this unit only had full staff 42 percent of the time. During a three month period from January 1996 through March 1996, approximately half of the staff in this unit worked less than 90 percent of their scheduled work hours.

The 15-year-old equipment for collecting revenue from subway faregates is also technically inefficient, outdated, and costly to repair. Electronic fareboxes manufactured by Cubic Precision, a system that cost MUNI approximately $5.2 million to purchase and install in 1991, do not receive the required preventive maintenance, causing MUNI to forego revenue as well as incur excessive depreciation costs. Because of this faulty equipment, revenue and staff are placed at risk during the collection process. For example:

- At the Embarcadero Station, staff were observed lining the bottom of the flasher unit (mobile repository that holds revenue containers) with a cloth bag in order for the extractable vault to fit properly into the flasher unit.
- At the Montgomery Station, a piece of cardboard was wedged between a faregate and the metal bar-lock, ensuring that the fare gate door remains completely closed and that the revenue canister is flush against the fare gate so that the internal microprocessor will read the revenue.
- At the Civic Center Station, staff were observed using a crowbar to pry a vault out of a flasher unit. Old vaults are welded together to collect and temporarily store revenue.
- There are not enough usable vaults to collect all the revenue from each fare gate. Staff were observed using a cloth revenue bag to collect the revenue out of fare gates that have the least amount of revenue (Forest Hill Station). Staff

handle revenue directly in this situation. Thus, there is minimal control over the receipt and security of cash in the stations when this occurs.

A survey of the subway revenue collection equipment revealed that there are sufficient numbers of vaults to temporarily transport collected revenue. However, this equipment undergoes constant maintenance and frequent modification by the Electronics Shop in order for MUNI to utilize and properly secure revenue.

The Director of Public Transportation should direct the Director of Enterprise Accounting to:

2.5.1 Update and distribute procedure manuals to indicate current operating procedures by October 1996, which would result in increased efficiency, effectiveness, and security over farebox revenues;

2.5.2 Develop alternative collection and processing schedules so that revenue can be deposited within one day, as required by the City's Administrative Code;

2.5.3 Develop and implement a performance standard by which to evaluate the productivity of fare collection receivers by October 1996;

2.5.4 Develop program incentives which will increase productivity and morale, and which comply with Civil Service rules, for staff to meet performance standards;

2.5.5 Complete structural improvements to the Revenue Processing Unit area by December 1996, which will ensure the safety of staff;

2.5.6 Coordinate with the Maintenance Division to establish an appropriate preventative maintenance schedule for electronic fareboxes;

2.5.7 Work with the Department of Parking & Traffic to establish a designated parking area for MUNI's revenue collection unit near the Market/Powell cable car turnaround by October 1996;

2.5.8 Develop a staffing plan which will ensure the timely and secure processing of farebox revenue;

2.5.9 Investigate contracting out for revenue processing services with a private vendor and BART, and report back to the Public Transportation Commission on feasibility and comparison to in-house staffing costs by January 1997;

2.5.10 If the program is to be retained in-house, evaluate the space needs of the processing unit, and investigate the feasibility of developing individual work stations; and, 2.5.11 Coordinate the current examination of the TransLink Project and the issues of concern to MUNI in relation to this project, with the potential procurement of subway fare collection equipment.

The costs for implementing potential staffing, contracting, and structural improvement alternatives cannot be estimated at this time. Other recommendations could be implemented by the Department at no cost.

Implementation of these recommendations would result in increased efficiency and productivity within MUNI's Revenue Collection Unit. In addition, the security of the staff and revenue would no longer be in jeopardy when procedures are established or updated. MUNI will earn an estimated $36,860 from annual interest income when it begins to comply with the City's Charter provisions and deposits the revenue by the day after it is collected.

3.1: Facility Planning

MUNI vehicle maintenance and storage facilities are at or above capacity. Construction of new facilities or expansion of existing facilities has been deferred by MUNI until after 2005 because anticipated federal, State and local funds have been allocated to replacing the entire fleet of light rail, trolley and diesel vehicles, as well as to major capital expansions, such as the F-Line. However, MUNI and its funding agencies must recognize that MUNI's ability to protect its investments in new vehicles will be jeopardized by reliance on inadequate maintenance and storage facilities. Implementation of certain facilities relocations would also enable MUNI to pursue potential revenue-generating development of MUNI property, as discussed in Section 3.2 of this report.

Major decisions on objectives, priorities and sites must be made before MUNI can effectively pursue funding for facilities projects. Among the key questions that must be resolved are the following:

- Will relocation of the Kirkland Division diesel bus facility to the Islais Creek site meet MUNI's needs for an improved maintenance and operations facility?

- Should MUNI pursue development of a central maintenance facility, or commit to decentralized basic maintenance, and develop a component repair facility?

- What other MUNI facilities should and could be located at Islais Creek? What is the optimum mix of uses for this site?

- Should the Presidio Division trolley facility be expanded at 949 Presidio, or relocated to facilitate revenue-generating development at this site. Are there potential sites for such a relocation?

- Where should the planned Metro East light rail vehicle facility be located? Depending upon the site selected, how soon will MUNI have to act to obtain the site?

- What specific functions and personnel should be located at a new administrative headquarters? What are their space needs?

- Where should a new administrative headquarters be located -- in the Civic Center near other government functions, or in the southeastern area of the City, near other MUNI facilities?

These are basic decisions, many of them interrelated, which must be made by senior management before MUNI can make any progress on major facilities improvements. The current lack of funding should not be used as an excuse to forestall making difficult decisions.

The Deputy Directors for Maintenance and Capital Projects should develop a two-year program, with suitable milestones, for creating a Facilities Master Plan. This program should include a decision-making structure that promotes input from all affected sections of the organization and establishes the accountability of senior management, as a group, for key components of the Plan. If necessary, MUNI should approach funding agencies, such as the San Francisco Transportation Authority, for additional funds to support dedicated staff to coordinate the process. MUNI should move aggressively towards applying for funds to complete key facilities projects as soon as possible, to ensure that riders receive the maximum benefits from the new vehicles being purchased.

In summary, MUNI cannot afford to defer major facilities improvements indefinitely, without jeopardizing its multi-million dollar investments in new LRV, trolley and diesel fleets, and effecting service on the street. Development of a comprehensive Facility Master Plan over the next two years is a crucial first step towards obtaining the necessary funding for such projects at the earliest possible date.

The Director of Public Transportation should:

3.1.1 Develop a two-year program, with suitable milestones, for creating a Facilities Master Plan. This program should include: (1) an analysis of the relationship between facilities constraints and service delivery, to further prioritize facilities projects and improve funding agency understanding of their importance to protecting the investment in new vehicles; (2) a conceptual analysis of the desired structure for delivery of maintenance services, by mode; (3) an assessment of identified site alternatives for meeting the highest priority long range maintenance and operations goals related to facilities; and (4) alternative financing plans and delivery schedules. Milestones should be defined to highlight decision points for the Deputy Directors and the Director.

3.1.2 Dedicate adequate staff to coordinate the Facilities Master Plan project, if necessary, soliciting additional funds from the San Francisco Transportation Authority.

3.1.3 Move aggressively towards applying for federal, State, and local transportation funds, as such funds become available (i.e., starting immediately in 2005, or earlier if anticipated funding opportunities are found) for the completion of top priority facilities projects identified in the Master Plan, to ensure that (1) the new fleets will be properly stored, maintained and operated; and (2) opportunities for optimal site selection will not be missed due to extensive delay.

Implementation of the above recommendations will put MUNI in a strong position to access grant funding for major facilities projects at the earliest possible date. Key facilities improvements are needed to protect the property's investment in new light rail, trolley and diesel bus fleets.

3.2: Disposition of Surplus Assets

MUNI currently has no property which has been declared as surplus property, or property which is excess to the needs of MUNI. However, certain MUNI facilities do not serve MUNI well in their current locations. If the functions can be relocated to more appropriate sites, then the existing sites would become available for sale or development by MUNI. However, there are no funds programmed for such relocations in MUNI's 1995-2005 Short Range Transit Plan.

The primary sites that present possible future revenue opportunities are: (1) the site of the Kirkland Division motor coach facility, in the Fisherman's Wharf area; (2) the 949 Presidio Avenue site, currently used as a trolley division and as MUNI's administrative headquarters; and (3) a parcel at the corner of Mission Street and Steuart Street, currently used as a layover lot for trolley and diesel bus lines. A preliminary assessment of the development potential of these sites has recently been conducted by a consultant. In addition, there may be opportunities for lease of ground or air rights surrounding MUNI substations.

It is crucial that MUNI complete the Facilities Master Plan that is discussed in Section 3.1, to determine how each site fits into its long term operational framework. The need to provide fully functional maintenance, operations and administrative facilities for MUNI activities should take priority over real estate disposition strategies, although facilities plans and revenue-raising efforts may be compatible in some instances. Once MUNI's facility plans have been clearly defined, it will be necessary to obtain more detailed cost and market analyses of identified development options.

The Director of Public Transportation should:

3.2.1 Require that consideration of proposals for revenue-generating sale or development of MUNI property be incorporated into development of MUNI's Master Facility Plan. Give planners clear guidance that provision of fully functional maintenance, operations and administrative facilities for MUNI should be the first goal of the Master Facility Plan, so that any surplus property disposition plans must be fully compatible with MUNI's operational priorities.

3.2.2 Consult with City officials to clarify to what extent revenue that might be generated from sale or development of MUNI property would be dedicated to MUNI. MUNI should only expend resources from scarce operating and capital funds for property development if such expenditure will help MUNI to meet ongoing budgetary needs.

3.2.3 Following preparation of a Master Facilities Plan, pursue planning for anticipated surplus property by (1) obtaining more detailed market analyses, (2) quantifying any toxics cleanup costs, and (3) comparing the present value of the projected income stream from development with projected revenue from sale of the property.

3.2.4 Ensure that sufficient staff resources are dedicated now to (1) determine whether relocation of the Mission Street and Steuart Street layover facility makes sense for MUNI operations, and (2) participate effectively in negotiations with the various public and private entities in the Embarcadero/Transbay Terminal area regarding the status of the layover function and any development of MUNI property.

3.2.5 Obtain an opinion from the Department of Public Health regarding whether any possible health risks exist that would preclude commercial lease of ground or air rights at MUNI substations. If such leases do not pose a health risk, obtain the assistance of the Department of Real Estate in identifying and marketing substations with the strongest lease potential.

Future sale or development of MUNI property that becomes surplus as a result of facility relocation could yield significant revenues to MUNI. Net revenue projections will have to be developed by MUNI using detailed market analyses and quantifying facility relocation costs and any site clean-up costs.

4.1 Capital Projects Management

Over the next ten years, MUNI will spend approximately $732.5 million on vehicle acquisitions. This will involve the purchase of LRVs, and trolley and diesel coaches.

Perhaps even more important than the amount of these planned expenditures is the long term effect fleet acquisitions will have on the quality of MUNI service to the public. It is crucial, therefore, that MUNI manage these projects in a manner that results in the timely delivery of high quality vehicles that meet operational and maintenance needs from both a functional and financial standpoint.

However, MUNI decision makers do not have a practical evaluation format to use when evaluating acquisition options, to ensure that full costs and benefits are considered. Furthermore, the roles and responsibilities of the project design phase are not clearly defined, contributing to the need for project changes at later, more costly phases of the project. Further, MUNI capital project cost and schedule control systems provide inadequate information to project managers, supervisors and funding sources.

Accordingly, the organization of the functional analysis and design phases of capital projects needs to be clarified and structured. With the help of capital grants staff, project managers should maintain and update records of expenditures by funding source, and should be required to include true baseline information in project cost reports and annual plans so that evaluation of projects is possible. Annual program plans should be prepared for each capital project which establish project milestones and line item budgets for the coming year; and compare planned, revised and actual milestones for the year just completed.

The Director of Public Transportation should direct MUNI's senior managers to:

4.1.1 Develop and rank detailed objectives for each fleet acquisition at the outset of work on the project, to provide a consistent format in weighing the costs and benefits of alternative design elements.

4.1.2 Develop an evaluation format for reviewing options related to procurements and other capital projects, that directly takes into account (1) increases or decreases to ongoing operational costs; (2) any facility or infrastructure changes that would be necessitated from selecting a particular option; and, (3) the detailed overall project objective developed pursuant to Recommendation 4.1.1.

4.1.3 Establish a formal process for decision-making on fleet acquisitions, providing clear guidelines regarding (1) what types of decisions should be referred to the Deputy Directors as a group; (2) the responsibilities of team members in obtaining input and consensus from line managers and senior management in Operations and Maintenance; and (3) the respective responsibilities of the consultant and the MUNI project manager in presenting decision packages to the project team and to the Deputy Directors, in a consistent format. Recommendations from project teams and decisions by the Deputy Directors should be documented.

4.1.4 Consider adopting a policy of assigning staff from the Project Management section of the Capital Projects Division to manage fleet acquisition projects, thereby allowing fleet engineers to focus on comprehensive analysis of specifications and designs.

4.1.5 Include the original, unrevised baseline budget (using the construction budget as of the bid award as the baseline for the construction portion of the budget, while establishing non-contract baselines as of project initiation) as a column in project cost reports and in annual project plans.

4.1.6 Require capital grants staff and project managers to work together to prepare annual project plans that establish fixed project milestones for both budget and schedule for the fiscal year, and that include a matrix allocating the line item budget to funding sources. Revise monthly cost reports to include comparisons of annual baselines to actual project progress. Annual project plans should include a historical overview, with cost figures and narrative explanations, of changes to the baseline and milestones.

4.1.7 Utilize the information from the revised project cost reports and annual plans to (1) evaluate capital projects staff; (2) improve budget estimation techniques; and (3) identify sensitive cost/time elements so these can be addressed by management.

The above recommendations can be implemented without additional cost. While cost savings from these procedural and organizational reforms cannot be projected, MUNI plans to spend approximately $732.5 million in federal, State and local Proposition B Transportation Sales Tax funds on fleet acquisitions over the next ten years. The vehicles that are purchased will effect MUNI operations and maintenance costs for nearly two decades. Improvements to the management of capital projects will thus have significant, system-wide financial and operational benefits.

4.2 Warranty Administration

The Public Transportation Department does not currently have a formal and dedicated warranty program that covers new vehicle procurement, parts, and contract repair work. A dedicated warranty program should be established with staff who are responsible for identifying warranty problems with vehicles and equipment, and submitting, monitoring and collecting on warranty claims.

Although no warranty program currently exists, MUNI collected an average $800,000 annually between 1984 and 1989 in warranty claims. That amount declined to $27,000 annually between 1989 and 1992, and thereafter MUNI has not reported any reimbursements.

The addition of a MUNI fleet and parts warranty program, with dedicated staff, would generate warranty reimbursements and credits from manufacturers and parts vendors which would exceed program cost. For example, MUNI currently contracts with outside vendors to rebuild diesel engines. These rebuilds have a one year, or 100,000 mile warranty on major parts used to complete the rebuilt engines. Two of the major components are the 6V92 Diesel Engine (mechanical or D-deck) which costs between $11,000 and $14,000, and the 747 Atec Allison Automatic Transmission which costs between $5,000 and $14,000. Since approximately 130 of these engines are programmed for replacement each year during the next few years, there is an estimated annual value of between $2.1 million and $3.6 million annually in warranties during this period. Because MUNI does not have a dedicated program to track what happens to these rebuilt engines after the diesel buses are returned to service, there is currently no opportunity to pursue warranty claims for reimbursement on these components within the warranty period.

We estimate that two additional staff costing an estimated $67,600 per year would result in at least $500,000 in annual savings, based on credits and reimbursements received in prior years and the planned purchase of $732 million in new revenue vehicles over the next ten years.

The Mayor and the Board of Supervisors should:

4.2.1 Approve staff and funding for a Warranty Administrator position and clerical support, as described in our finding.

The Director of Public Transportation should:

4.2.2 Assign the authorized staff to a dedicated program to administer warranties for new revenue vehicles, major vehicle repairs, and parts;

4.2.3 Establish procedures which require the Warranty Administration to develop and recommend warranty terms and conditions to be included in all contact proposals for vehicle and parts purchases and rehabilitation;

4.2.4 Amend on-going parts supply contracts to include more specific warranty language, as developed by the Warranty Administrator;

4.2.5 Formalize a process for capturing all in-service information on new revenue vehicle purchases as is required for warranty purposes;

4.2.6 Initiate negotiations with major parts suppliers to base warranty time periods on vehicle installation dates rather than the date a part is received;

4.2.7 Review detailed coach repair and parts issue records on a periodic basis to provide more accurate and timely identification and processing of warranty claims;

4.2.8 Enforce a policy requiring that all parts with warranties be dispensed on an exchange basis only. In order to identify these parts, a parts exchange list and parts issue log should be developed and utilized; and,

4.2.9 Develop a cross referencing system to identify and to match maintenance work orders and component failures by individual vehicle number. Use this system for claim follow-up and analysis.

Implementation of these recommendations would result in costs of $67,600 for warranty program staff.

We conservatively estimate that such a program would generate at least $500,000 in annual savings, based on actual credits and reimbursements received in prior years, and on estimated purchases of $732 million in new revenue vehicles and $10 million annually in major replacement modules and parts over the next ten years.

Accordingly, MUNI should realize a net benefit of at least $432,400 annually after implementation of these recommendations.

5.1 Work Rule Impacts on Service and Costs

As part of this study, we reviewed Department surveys and independently contacted the following transit properties regarding their work rule provisions: (1) Santa Clara County Transit District-SCCTD, (2) Portland Tri-Met, (3) Pittsburgh-PAT, (4) Atlanta-MARTA, (5) Baltimore-MTA, (6) Seattle-Metro, (7) Washington DC-WAMTA, (8) Boston-MBTA, (9) Philadelphia-SEPTA, and (10) Los Angeles-LACMTA. The current Memorandum of Understanding for Platform Operators contains various work rules which are inconsistent with the practices of these other major transit operators nationally and within the Bay Area, and impact the ability of management to efficiently operate the Municipal Railway. These work rule issues are listed below:

1. Limitation on Use of Part Time Operators

The MOU allows MUNI to utilize a maximum ratio of 12 percent part-time operators to full-time operators. Six of the ten properties surveyed allowed a higher percentage of part-time operators than are allowed in MUNI's current MOU.

2. Requirement to Schedule Saturday and Sunday as Days Off

The MOU requires that a minimum of 700 operators (amended to 650 operators by a side letter) be scheduled to have both Saturday and Sunday as days off. None of the ten transit properties surveyed are required to schedule any number or percentage of their operators off on both Saturday and Sunday.

3. Split-Time Overtime Penalty

Operators are paid overtime (split-time) for all hours scheduled to be at work in excess of 10 hours, even if total actual work time is 8 hours or less. This provision is also included in Section A8.450 of the City Charter. Of the ten transit properties surveyed, only Boston and Washington DC require payment of overtime after 10 hours. The remaining eight transit properties are not required to pay split-time pay until 10 hours and 30 minutes, or longer.

4. Maximum Scheduled Time Per Day

The MOU prohibits the Municipal Railway from scheduling part-time or full-time operators to be at work in excess of 12 hours unless the operator agrees. This limitation requires the Municipal Railway to add runs on certain lines to meet the scheduled service at greater cost than paying additional overtime. All of the ten transit properties surveyed are allowed to schedule spread times of more than twelve hours for all or part of their operators.

5. Number of Months Driving To Reach Maximum Salary

Newly hired Platform Operators presently receive maximum platform operator pay after 18 months from the date of hire. All of the ten transit properties surveyed require 30 months or more before operators are paid the maximum rate of pay.

4.2.3 Establish procedures which require the Warranty Administration to develop and recommend warranty terms and conditions to be included in all contact proposals for vehicle and parts purchases and rehabilitation;

4.2.4 Amend on-going parts supply contracts to include more specific warranty language, as developed by the Warranty Administrator;

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5. Number of Months Driving To Reach Maximum Salary

Newly hired Platform Operators presently receive maximum platform operator pay after 18 months from the date of hire. All of the ten transit properties surveyed require 30 months or more before operators are paid the maximum rate of pay.

6. Limitation on Driving Time

Operators assigned to more than six hours of continuous work are paid 20 minutes straight-time pay in lieu of a lunch period. Only three of the ten transit properties surveyed have similar requirements for additional pay in lieu of a lunch period.

The Director of Public Transportation should:

5.1.1 Develop a negotiating package which clearly separates efficiency from compensation issues, and approach the union with a proposal for modifying the current bargaining agreement to allow for more efficient use of platform salary appropriations.

5.1.2 Identify potential program enhancements that mutually benefit employees and the public, such as increased training and safety on transit vehicles.

The combined savings from recommendations contained in this finding would result in savings of at least $3.2 million per year which would be saved by reducing the number of non-productive operator hours which must be scheduled to provide current services, and result in more efficient use of platform operator resources. These savings could be reprogrammed for other MUNI services, or used to obtain program enhancements that mutually benefit employees and the public, such as increased training for vehicle operators.

6.1 MUNI Security

The San Francisco Police Department's MUNI Transit Company police officers are effectively deployed given current SFPD personnel assignments and 1995 criminal activity reports.

In addition, decisions by the Mayor to require District Station police officers to inspect MUNI vehicles at least one ride per shift is a good mechanism for increasing 24-hour police officer presence on the system. Other initiatives to coordinate school related juvenile ridership with the SFUSD, and place civilian monitors on MUNI vehicles (including teachers and parents) are also positive crime prevention actions.

Despite these efforts and a recent reported drop in criminal activity on MUNI vehicles, public perception that the Municipal Railway is unsafe continues. Although most of the trouble reported on MUNI vehicles is not considered by the SFPD to be major crimes, all such trouble has a significant impact on perceptions of safety held by the riding public. One high profile crime can become the cause of significant concern among riders, as can multiple "uncomfortable situations" experienced by some passengers who may share transit vehicles with large groups of loud and offensive riders.

Based on our review, several general conclusions can be drawn regarding criminal activity on MUNI vehicles, and at stations and stops.

- Although criminal activity on MUNI occurs during all hours, the highest weekday concentration of trouble occurs during two primary periods: (1) approximately 2:00 PM to 4:00 PM; and, (2) approximately 6:00 PM to 9:00 PM each afternoon and evening.
- Criminal activity occurs on some transit lines more frequently than on others. The lines with the most criminal activity include the 15, 14, and 38, which also have some of the highest ridership in the City. Trouble is reported, on average, more than once per day on these lines.
- Over 54 percent of the trouble reported on MUNI is for less serious crimes, infractions, and disturbances. Approximately 15 percent of the trouble reports involve operators, either as the victims of assault or threatened assault, or in altercations with passengers.
- Criminal activity occurs at MUNI stops and stations primarily within the Mission and Ingleside Police Districts. These two districts experienced over 50 percent of the trouble reported at major transfer point intersections during the past year.
- Juveniles are identified as the perpetrators or victims of crime in approximately 25 percent of all trouble incidents reported by the MUNI Transit Company. However, this profile is probably understated since reporting depends on the perceptions of the individual making the report and the accuracy of the record. SFPD estimates that juveniles are involved in more like 60 percent to 75 percent of all criminal incidents in the City.

The City could increase public safety on MUNI vehicles, in stations and at stops by: (1) modifying Deployment practices related to district station, Juvenile Division, and MUNI Transit Company operations; (2) increasing efforts to enhance rider awareness of safety and crime reporting; and, (3) adopting the best practices of other jurisdictions related to crime prevention and suppression in transit systems.

The Chief of Police should:

6.1.1 Incorporate modified deployment policies to provide expanded juvenile and MUNI law enforcement capacity at the district stations, as described in this report.

6.1.2 With the Director of Public Transportation, evaluate the best practices of other transit properties for implementation in San Francisco. Adopt programs used at these other properties, as appropriate.

The Director of Public Transportation should:

6.1.3 Initiate a campaign to obtain private sector contributions for an expanded public Crime and Safety Awareness Campaign;

6.1.4 Direct the Acting Director of Community Relations to develop a proposal for a public Crime and Safety Awareness Campaign which incorporates contributed services from the private sector, and is at least partially funded from private donations.

6.1.5 With the Chief of Police, evaluate the best practices of other transit properties for implementation in San Francisco. Adopt programs used at these other properties, as appropriate.

There should be no additional costs to redeploy police officers within the SFPD. Costs for implementing an expanded public awareness campaign and adopting best practices in other transit properties can not be determined until MUNI and the SFPD complete efforts to obtain private sector contributions, and evaluate the appropriateness of programs used by other transit properties for implementation in San Francisco.

Implementation of these recommendations will improve SFPD effectiveness at addressing juvenile crime on MUNI buses, and will increase public awareness and participation in crime prevention and reporting on MUNI vehicles and at stations and stops.

7.1 Contracting for MUNI Service

MUNI currently contracts for many transportation and transportation-related services. However, the only contract to provide direct passenger services is for paratransit services, which costs MUNI approximately $10.7 million per year.

Many transit agencies throughout the United States presently contract with private companies to provide other passenger services. Our review of available literature, and of the experience of these other transit agencies, indicates that competitive contracting generally results in cost savings due to lower transit employee salaries and higher productivity work rules.

However, the quality of service and the level of vehicle maintenance can be at risk under a contracting system. Also, some representatives of properties that use contract services have publicly reported that after the first several years of contracting, costs can begin to reach those that would have been incurred with an in-house program.

Before considering potential contracting opportunities, the Mayor, the Board of Supervisors, the Public Transportation Commission, and MUNI management need to clearly define: (1) the criteria to be used for selecting routes and services to be contracted; (2) the controls that are needed to ensure continued service and maintenance quality; and, (3) a process that would ensure fair competition between MUNI employees and the private sector when evaluating proposals. Until these major policy issues are defined, the City should not pursue contracting opportunities for specific routes.

The Public Transportation Commission should:

7.1.1 Direct the Director of Public Transportation to identify service elements, and develop and present criteria that will encourage practical, cost effective contracting solutions for transit services.

7.1.2 Require that MUNI management submit a report to the Commission, no later than three months after the acceptance of these management audit recommendations, that clearly presents potential service elements, selection criteria and quality controls appropriate for a contracting program.

7.1.3 Direct the Director of Public Transportation to update and utilize the transit service costing model previously implemented by the Department to aid in identifying routes and services to be contracted.

7.1.4 Direct the Director of Public Transportation to establish a process to ensure fair competition between public sector employees and the private sector when evaluating proposals.

There are no costs associated with these recommendations.

By implementing these recommendations, MUNI will be better positioned to determine whether or not the implementation of a contract service program would result in cost savings, and whether service quality and safety would be maintained.

7.2 Coordinating Inter-Jurisdictional Service

The Golden Gate Bridge, Highway and Transportation District, AC Transit, and SAMTRANS provide passenger service within the City and County of San Francisco which, in part, duplicates service provided by the Municipal Railway.

While the current level of service of these transit properties is needed during the AM and the PM peak hours, excess capacity is available during the middle of the day and evening hours. Municipal Railway lines, some of which partially duplicate this service, also have excess capacity during the middle of the day and evening hours.

The Municipal Railway should work with the adjacent transit properties to provide coordinated service at reduced cost during non-peak hours. Agreements with these adjacent transit properties would allow MUNI to adjust schedules to provide the same or an increased level of services to commuters within the City limits. The savings to the other transit properties would be shared with MUNI either through revenue transfers, or by the other property assuming direct responsibility for providing equivalent or improved service on existing MUNI lines.

The Director of Public Transportation should direct MUNI staff to:

7.2.1 Review all transit services provided by adjacent operators to identify duplication of service and mutually beneficial changes in schedules that would provide the same or an increased level of services at reduced cost.

7.2.2 Work with these adjacent transit properties and the Metropolitan Transportation Commission to coordinate service which would result in cost savings that could be shared by each property.

There would be no increased cost to implement these recommendations.

Implementing these recommendations would provide improved service at reduced cost for the citizens of San Francisco and adjacent communities.

The detailed discussion of each of these findings and recommendations is contained in the body of our report, which is attached. We are available to present the report to the Public Transportation Commission, and will attend each of the public hearings which will be scheduled during the next three months to respond to questions and comments regarding the report content. We are also available to present the report to the Board of Supervisors and to the Mayor, as requested.

We are available at all times to respond to any questions related to the findings and recommendations contained in our report.

Respectfully submitted,

Harvey M. Rose
Budget Analyst

cc. Kathleen Knox, Vice President, Public Transportation Commission
Andrew Sun, Member, Public Transportation Commission
Dennis Herrera, Member, Public Transportation Commission
H. Welton Flynn, Member, Public Transportation Commission
Emilio R. Cruz, Director of Public Transportation
Mayor Brown
President Shelley
Supervisor Alioto
Supervisor Ammiano
Supervisor Bierman
Supervisor Brown
Supervisor Hsieh
Supervisor Katz
Supervisor Kaufman
Supervisor Leal
Supervisor Teng
Supervisor Yaki
Clerk of the Board
Controller
Margaret Kisliuk
Ted Lakey

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Introduction

In accordance with voter mandates included in Proposition J (1995), the Budget Analyst has performed this Management Audit of the San Francisco Municipal Railway.[1] To comply with the Proposition, the Public Transportation Commission will be required to conduct "three consecutive months of public hearings to review the findings and recommendations" contained in the Budget Analyst's report, and to "approve and propose to the Mayor its recommended action plan for implementation of audit recommendations and related steps to improve service, safety, and cost-effectiveness." At the conclusion of the public hearing process, the Budget Analyst's final report will be presented to the Mayor and Board of Supervisors, along with the Public Transportation Commission's recommendations and action plan.

Project Scope

The text of Proposition J requires that the Budget Analyst conduct a "comprehensive management audit" of the Municipal Railway. However, the amount of funding designated for the management audit in Proposition J was sufficient to fund only a limited scope study for an agency the size and complexity of MUNI.[2] Due to limitations in funding for the study, and specific language in the Proposition J text which defines the minimum content of the required audit, the Budget Analyst's ability to modify study priorities was constrained. Accordingly, the Budget Analyst developed a limited scope management audit work plan which was consistent with the Proposition J text. This limited scope work plan was reported to the Mayor and Board of Supervisors in connection with the supplemental appropriation ordinance approval process. The limited scope management audit work plan is attached to this report as Appendix 1.

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[1] Proposition J was approved by the San Francisco voters on November 7, 1995. Included in the Proposition were requirements that the Budget Analyst of the Board of Supervisors conduct a "comprehensive management audit" of the Municipal Railway and "deliver a report of its findings and recommendations to the Transportation Commission" within seven months of the effective date of the implementing ordinance.

[2] Shortly after Proposition J was approved by the voters, the Budget Analyst advised the Mayor that the amount of funding designated in the text of Proposition J was not sufficient to perform a comprehensive management audit of the Municipal Railway. The supplemental appropriation request made by the Mayor to the Board of Supervisors was limited to the amount included in Proposition J, and did not provide the amount estimated by the Budget Analyst to be necessary to complete a comprehensive scope management audit.

Proposition J requires that:

> "(c) The audit shall include, but not be limited to the following:
>
> (1) Improved Service and Scheduling
> (2) Increasing Cost Efficiencies
> (3) Selling of Surplus Assets
> (4) Acquisition Plans for New Equipment
> (5) Salaries and Employee Benefits
> (6) Safety of Passengers and Drivers
> (7) Contracting Out Specific Routes"

Our findings and recommendations have been organized according to these specific audit areas so that consistency with the voter initiative is readily apparent.

Methodology

This management audit was performed according to standards contained in *Governmental Auditing Standards, 1994 Revision,* which is promulgated by the Comptroller General of the United States. Participating auditors for the study included the joint venture firms who presently contract with the City and County of San Francisco for Budget Analyst services provided to the Board of Supervisors.

The project period extended from January 26 through July 11, 1996. During this period, the following principal activities were performed:

Entrance Conference: An entrance conference was conducted with the Director of Public Transportation and Division managers of the Municipal Railway.

Pre-Audit Survey: An overview assessment of MUNI operations was conducted as an initial step to identify potential finding areas requiring further review and analysis by the audit team. As part of this pre-audit survey, interviews with management and tours of facilities were conducted, announced and unannounced visits were made to most facilities during all hours of operations, all vehicle modes were ridden by project team members, and comparative statistics generated by the Federal Transit Administration (FTA) were analyzed. In addition, a telephone and FAX survey of selected properties similar to MUNI was conducted. Survey properties were identified based on broad comparative criteria related to the number and type of transit modes that each operates (i.e., light rail, diesel bus, and trolley bus), ridership, and operating environment (terrain, climate, and/or degree of urbanization).

Field Work: Extensive field work was conducted to obtain a more detailed understanding of MUNI operations, and to investigate and validate potential finding areas identified during the pre-audit survey phase of the study. These field work activities included interviews with supervisors and line staff, follow-up discussions with other transit properties surveyed for this study, and analysis of information and data collected from MUNI and other departments of the City and County of San Francisco.

Preparation of Draft Report: Based on the results of these previous management audit steps, a draft report was prepared which provided a statement of each finding, the analysis used to support the finding, and the Budget Analyst's conclusions, recommendations for corrective action, and assessment of the benefits to be derived from implementing the recommendations.

Exit Conference and Final Report: An exit conference was conducted with MUNI management to review the draft report and provide an opportunity for MUNI management to identify areas of the report requiring correction or clarification. The management of the Municipal Railway was invited to provide a written response to the management audit report. However, the Director of Public Transportation chose to issue only a limited response which does not address the substantive issues included in the Management Audit. Instead, he stated that the Department would respond directly to the Public Transportation Commission after the release of the final report. Based solely on the results of the exit conference process, we therefore produced this final report which has been delivered to the Public Transportation Commission.

Current Organization and Operations of the Municipal Railway

The Municipal Railway is a department of the City and County of San Francisco. MUNI is managed by a Director of Public Transportation, who reports to the Mayor through a five member appointed Public Transportation Commission. As part of the City and County, the Municipal Railway's annual operating budget is proposed by the Mayor and authorized by the Board of Supervisors.

In addition to the Director of Public Transportation, the Municipal Railway has one Chief of Staff and four Deputy Directors who manage an authorized staff of approximately 3,570 employees.[3] Included in this total are 1,833 authorized Transit

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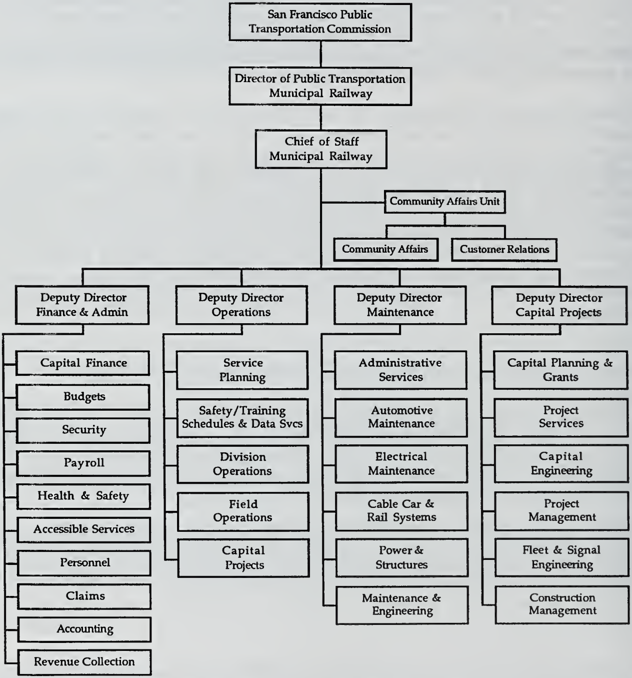
[3] This number represents the authorized positions for MUNI which are included in the Salary Ordinance of the City and County of San Francisco. An assessment of the current workforce and MUNI budget is provided later in this report.

Operator positions, which represent approximately 51 percent of the total workforce. The organization chart below illustrates MUNI's current high level organization.

Organization of the San Francisco Municipal Railway 1996


San Francisco Public Transportation Commission
Director of Public Transportation Municipal Railway
Chief of Staff Municipal Railway
Community Affairs Unit
Community Affairs
Customer Relations
Deputy Director Finance & Admin
Capital Finance
Budgets
Security
Payroll
Health & Safety
Accessible Services
Personnel
Claims
Accounting
Revenue Collection
Deputy Director Operations
Service Planning
Safety/Training Schedules & Data Svcs
Division Operations
Field Operations
Capital Projects
Deputy Director Maintenance
Administrative Services
Automotive Maintenance
Electrical Maintenance
Cable Car & Rail Systems
Power & Structures
Maintenance & Engineering
Deputy Director Capital Projects
Capital Planning & Grants
Project Services
Capital Engineering
Project Management
Fleet & Signal Engineering
Construction Management

In FY 1995-96, the Department was initially authorized an operating budget of approximately $280 million. Over $206 million, or 73.6 percent of this amount was for salaries and benefits (including temporary salaries and overtime). The balance of approximately $74 million was for contract services provided by private vendors and by other City and County departments, materials and supplies, judgments and claims, and capital outlay. In FY 1996-97, the Department's operating budget has been increased to approximately $285 million.

These expenditure appropriations were budgeted to be supported by the following sources of income for the Municipal Railway:

Table 1

City and County of San Francisco
Municipal Railway Sources of Operating Funds
FY 1995-96 [a]

Sources of Operating Funds	Amount
Operating Income	94,407,189
Subventions & Grants	60,790,029
Transit Impact Development Fees	4,429,000
Sub-Total MUNI Sources	159,626,218
Transfers-In from City Sources Other than the General Fund[b]	67,862,542
Parking Tax and Garage Revenues	17,396,057
General Fund Operating Subsidy	35,610,783
Sub-Total Other Local Sources	120,869,382
Total MUNI Operating Income	$280,495,600

[a] Based on the approved FY 1995-96 operating budget. Does not include approximately $2.2 million in supplemental appropriations reportedly authorized since July 1, 1995.

[b] Includes funding received from the Traffic Fines Fund, Hetch Hetchy Operating Fund, and Senior Citizens Program Fund.

As shown in the above table, MUNI was budgeted to generate approximately $159.6 million, or 57 percent of its total revenue from Operating Income (i.e., farebox revenue, advertising revenue, etc.), Subventions and Grants (from the federal and State governments) and dedicated fees (Transit Development Impact Fees). The balance of $120.9 million, or 43 percent of total departmental revenue, was budgeted to be received from local sources which are not directly related to MUNI activity. In fact, over $35.6 million of the $120.9 million in other revenues was budgeted to be received as a direct operating subsidy from the General Fund. The remainder was to be provided from parking taxes, garage revenues, traffic fines and other revenues designated by ballot measure to support MUNI operations.

Based on the "1995-96 Eight Month Budget Status Report" prepared by the Controller in April 1996, and subsequent Board action, MUNI required an additional General Fund contribution of approximately $1.8 million in order to fund its operations. This additional contribution was projected based on the combined impact of the following favorable and (unfavorable) variances from budget:

Resource Variance		
Passenger Fares	$2,476,000	
Other Revenues	2,994,000	
Other Sources	(801,000)	
Total Resource Variance		$4,669,000
Expense Variance		
Personal Services	($1,676,000)	
Workers Compensation	(4,169,000)	
Other Expenses	(575,000)	
Total Expense Variance		($6,420,000)
Net Variance		($1,751,000)

Thus, MUNI was projected to generate approximately $4.7 million in net additional revenues during FY 1995-96, 53 percent of which results from unanticipated passenger fares. Had these revenues not materialized, the increased contribution required from the General Fund would have been $6.4 million rather than the $1.8 million reported by the Controller.[4] Accordingly, MUNI was projected to overspend its expenditure budget by an estimated 2.3 percent for the fiscal year.

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[4] During 1995-96, the Controller reports that MUNI received $2.2 million in supplemental appropriations, which is included in the department's base budget amount used to compute these variances from budget. Therefore, MUNI will require approximately $8.6 million more to operate than was projected at the beginning of 1995-96.

Comparison with Other Transit Properties

As part of this study, we compared the Municipal Railway with other large transit properties within the United States. Based on this comparison, MUNI is clearly one of the most complex and heavily used transit systems in the Country. The following observations, made by analyzing data compiled by the federal government, illustrate this point.[5]

- The Municipal Railway operates four separate modes of transportation (light rail, trolley bus, motor bus and cable car). This is a greater variety than any other transit agency in the Country when diesel rail, heavy rail and commuter rail systems are excluded from the comparison.
- The Municipal Railway is the only major transit agency which operates cable cars as part of its general system of transportation services.
- The Municipal Railway is one of only four major transit agencies which operate trolley buses. The others are the Southeastern Pennsylvania Transit Authority (SEPTA), the Massachusetts Bay Transit Authority (MBTA), and the Seattle-Metro Transit Authority. San Francisco operates more trolley buses than the total of the other three transit agencies combined.
- The Municipal Railway operates over 100 light rail vehicles during peak travel periods. This is second only to MBTA, which operates 177 light rail vehicles during peak travel periods.
- The Municipal Railway provides the greatest average number of motor bus passenger trips per hour of service of any major transit agency in the Country.
- Second only to SEPTA, the Municipal Railway provides the greatest average number of trolley bus passenger trips per hour of service of any major transit agency in the Country.
- The Municipal Railway provides the third greatest average number of light rail passenger trips per hour of service of any major transit agency in the Country. Only MBTA and SEPTA provide a greater number of light rail trips per hour.

In addition, MUNI faces other challenges that are uncommon for transit agencies within the United States. Services are provided in a compact geographic area, on narrow streets which are heavily congested with automobile traffic during peak hours of service. Motor and trolley buses must navigate steep hills, and maneuver through tight intersections in many locations within the City. Although not faced with winter snow and cold, as are some properties in the middle and eastern sections of the Country, in many respects the physical characteristics of San Francisco make transit services equally difficult to provide.

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[5] Federal Transit Administration, "1994 National Transit Database".

Condition Assessment of the Municipal Railway

This Budget Analyst study mandated by Proposition J follows on the heels of many internal and external studies of the Municipal Railway. In recent years, MUNI has been evaluated as part of the federal and State transportation funding process, and by initiative of the Mayor and Board of Supervisors, by the San Francisco Municipal Railway Improvement Corporation, and by the community through the Chamber of Commerce.

During the course of this study, the Municipal Railway presented a major "Condition Assessment" of its operations to the Public Transportation Commission. The public presentation of this Condition Assessment was attended by the Budget Analyst, and the conclusions presented by MUNI management were reviewed.

Based on our review of the Condition Assessment and other reports produced by MUNI and external review agencies[6], as well as additional analysis conducted by Budget Analyst staff, we have drawn the following broad conclusions regarding the operations of MUNI:

1. The Municipal Railway's budget has increased at a rate below inflation during the past five years. As a result, MUNI's absolute budget has decreased during this period when adjusted for inflation.

2. MUNI has assumed responsibility for certain administrative and support functions which previously had been provided by the Public Utilities Commission (PUC) prior to 1994. The additional operating burden placed on MUNI from the assumption of these underfunded functional transfers has severely impacted the department's ability to provide reliable service to the San Francisco community.

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[6] Principally the MTC Triennial Performance Audit of the Municipal Railway, the San Francisco Chamber of Commerce "Case for Constructive Change", the Transportation Authority "Strategic Plan", and the San Francisco Municipal Railway Improvement Corporation "Municipal Railway Assets Development Study."

3. The service impacts from budget reductions and the loss of PUC support has been exacerbated by an aging vehicle fleet that requires increased maintenance and repair effort to operate.

4. Many of the Municipal Railway's facilities are aging and are not designed to accommodate the new equipment that is being purchased by the Department. The difficulties presented by facility condition will impact MUNI's future ability to provide reliable services.

5. The City and County has not implemented formal service reductions that will allow MUNI to efficiently operate within funding levels authorized by the Mayor and the Board of Supervisors.

These general conclusions are discussed in more detail within the body of this report. Our specific recommendations, included at the end of each finding, provide many specific steps that MUNI should take to improve service and increase efficiency. However, we believe that unless the City and County seriously considers targeted service reductions, or identifies additional sources of revenue to supplement current levels of General Fund support, MUNI service quality will continue to deteriorate.

Recent Efforts to Improve the Cost Effectiveness of MUNI Services

This report presents a critical evaluation of MUNI operations, appropriately identifying problem areas within the organization in order to provide recommendations for corrective action. Because of the critical nature of this study and of management audits in general, we believe it is appropriate to recognize the Department of Transportation's efforts to stabilize and improve MUNI operations during the recent period of declining resources.

Accordingly, this section of the Introduction provides summary descriptions of some of MUNI's most noted accomplishments. MUNI has:

- Reorganized in 1995-96 by creating the Office of the Director, which consolidates the various functions that support the Director and the Public Transportation Commission. This is a positive step toward enhancing the support given to City and County decision-makers, and improving communications with the public and employees.

- Developed and implemented a comprehensive data collection plan devised to produce line level ridership data for internal planning purposes, scheduling, and federal Section 15 ridership reporting.

- Developed and sought approval for a Comprehensive Integrated Safety and Loss Prevention Program which is intended to reduce the incidence of worker injury and accompanying Workers Compensation Cost. Such a program is critical for protecting workers and the public, and for reducing the costs of Workers Compensation.

- Transferred capital grants staff from the Finance Division to the Capital Projects Division to improve coordination between capital financial staff and project managers.

- Successfully implemented a substance abuse testing program required by the Omnibus Transportation Employee Testing Act of 1991. Although we were unable to conduct a detailed review of the program as part of this management audit, the reported design of the program and the Department's success with achieving compliance with federal law appears commendable.

- Successfully implemented a Graffiti Prevention program which has substantially improved the appearance of MUNI vehicles. Although vandalism continues (e.g., broken windows), the success of this campaign has been significant.

Under the guidance of the Public Transportation Commission, MUNI is making an effort to more effectively identify operating problems and implement changes to its system which will improve services and reduce costs. Each of these examples demonstrate instances where Department initiatives have resulted in positive change. The challenge for the Department is to continue with such efforts in an operating environment characterized by diminishing resources. Our recommendations focus on practical steps that will help MUNI provide service more successfully.

Additional Areas Recommended for Study

As discussed previously in this Introduction, we have not been able to perform a comprehensive management audit of the Municipal Railway due to the level of funding authorized for this study. Accordingly, there are many potential finding areas that we identified during the course of this audit which we believe deserve additional study and analysis. These areas are described below:

- Opportunities exist for City and County transit system decision-makers to work closely with the Metropolitan Transportation Commission (MTC) and local transit operators to improve coordination and cooperation on regional transportation issues. Current initiatives to develop and implement programs such as regional transit fare systems and centralized transit public information systems are all deserving of significant attention as mechanisms for reducing cost and improving service to the public. The Public Transportation Department should explore and aggressively pursue potential economies and efficiencies which could occur from sharing BART change machines and other station technology at shared locations.

- The Public Transportation Department should conduct a thorough update of all formal procedures within MUNI. During our review we noted circumstances where procedures and operating manuals were limited or nonexistent, and procedures for similar activities were undocumented and inconsistent. The development of technical and procedure manuals are particularly important with the planned implementation of new equipment and systems.

- The City and County should conduct a detailed review of MUNI personnel management functions, which includes an evaluation of position control needs unique to transit operations, and an assessment of the costs and benefits of an integrated data base for the management of all MUNI personnel. During our review we found that records maintained by the MUNI personnel unit, scheduling, and the City and County were inconsistent and inaccurate.

- The Public Transportation Department should investigate allegations of transfer, fast pass, and discount pass fraud which we heard during interviews for this study. If the existence of such fraud is found, the City and County should investigate specific allegations and, if necessary, modify procedures and the physical characteristics of entrance stations to prevent future incidence of fraud.

- The Public Transportation Department should examine and report to the Public Transportation Commission on the status of its current operator training program. During our review, we were advised that MUNI has extreme difficulty meeting operator refresher training and accident retraining requirements established by State law and policy. In addition, because much training is mandated by the federal and State governments, the Department should develop a program to propose and support the Mayor, members of the Board of Supervisors, and local legislators with initiatives to obtain federal and State reimbursement for the cost of training and operator replacement during refresher training periods.

- The Public Transportation Department should be directed to report to the Public Transportation Commission on the number and assignment of non-revenue vehicles to employees. Information received during the pre-audit survey phase of this study suggested that the number of assigned vehicles may be excessive, and the "take home policy" of the Department may be liberal.

Acknowledgments

We would like to thank the management and staff of the Municipal Railway for their cooperation during the course of this study. In addition, we would like to thank representatives from the Federal Transit Administration, the Metropolitan Transportation Commission, the San Francisco Transportation Authority, the American Public Transit Association, and the many transit properties from across the Country who enthusiastically provided data against which the operations of MUNI could be compared.

1. Improved Service and Scheduling

Proposition J specifies that the Budget Analyst identify methods for MUNI to provide improved service and scheduling. It is our view that such improvements depend principally on management's ability to effectively use resources in a manner that supports the City and County's transit service and scheduling goals.

Because over 74 percent of MUNI's operating costs are for personnel, we believe this means that management must focus on methods for organizing, managing, and supervising staff. Accordingly, the following sections of this report focus on certain general topics which we believe would have a direct impact on services:

- Organization and Management: This finding examines whether the current structure of MUNI fosters clear lines of authority and accountability for meeting the service goals of the Department. It compares organizational and management trends in other U.S. transit properties with the current organization of MUNI, and identifies methods for increasing worker responsibility over services through organizational alternatives.

- Improved Scheduling: Two findings in this section assess the ability of the Department to provide policy levels of service given current resources authorized by the Mayor and Board of Supervisors. The first finding compares authorized operator positions against scheduled service, and identifies factors that lead to insufficient operators required to meet scheduled service. The second finding examines scheduling efficiencies and potential cost savings which might be achieved with the implementation of an expanded Proof Of Purchase (POP) program, eliminating the need for multiple operators to be scheduled on coupled light rail vehicles.

- Supervision: Four findings discuss the need for increased supervision and the implementation of enhanced management controls over staff activities. Documented observations of transit and maintenance operations indicates that because of a lack of adequate supervision, service quality and consistency has diminished, and City and County assets are at risk.

- Vehicle Reliability: One finding demonstrates that because there has not been adequate engineering staff in the Maintenance Division, vehicle reliability has deteriorated and the cost of maintaining vehicles is higher than necessary. New vehicle acquisition can also be more costly than necessary because maintenance engineering support is not available during the acquisition planning phase.

Each of these issues is discussed more fully in Section 1 of this report.

1.1 Organization and Management

- **The Municipal Railway's direct service activities are presently organized by the principal functions of Operations and Maintenance, with management and support activities performed by the Director's Office, Capital Programs, and Finance, Administration and Personnel. This organizational structure creates a system of management by specialty, but reduces accountability by service or product line (e.g., diesel, trolley, light rail, and cable car services).**

- **Other large transit properties with multiple vehicle modes are organized according to general service. This organizational structure fosters management accountability while retaining suitable levels of technical specialty within the organization.**

- **The Department and the Public Transportation Commission should consider alternative organizational structures for the Municipal Railway in order to increase management accountability, responsibility, and timeliness of decision-making over major service modes.**

The Public Transportation Department is presently organized by major activity, or function, rather than service. A general organizational profile is presented below:

Deputy Director	Functional Area	1995-96 FTEs[1]
Director	Performs management, oversight, and customer service functions.	29
Operations	Provides direct transit services to the public.	2,112
Maintenance	Maintains all transit vehicles, fixed guideways, facilities, and support systems.	1,033
Capital	Plans and implements all capital acquisition and construction projects.	135
FAP[2]	Conducts finance, administration, and personnel support functions.	138

[1] Includes grant and non-operating fund positions, based on the Mayor's FY 1996-97 recommended budget.

[2] The Finance, Administration, and Personnel Division.

We agree with the general organization of the Director's Office, which: provides high level management of the Department; implements policy; and monitors service quality through its customer service unit, and its staff liaison functions to the Public Transportation Commission (PTC) and elected officials. The Finance, Administration, and Personnel Division is also appropriately organized to provide centralized administrative support to the other divisions of the Department. Capital Projects, which provides acquisition and capital improvement support to the divisions, is also appropriately placed within the overall Department organization, although later sections of this report discuss the need to better integrate the activities of the Capital Projects Division with Operations and Maintenance functions.

It is the distinction that is made between the Operations Division and the Maintenance Division that we believe creates a dynamic which has contributed to weaknesses in the management and decision-making processes in the Department. Some of the more significant of these weaknesses are described below.

- Many crucial day-to-day and long-range decisions must be made by balancing operating, maintenance, and capital concerns regarding particular transit modes. The current organization creates an environment which diffuses accountability and responsibility to the point that few individuals below the deputy director level feel comfortable making decisions, or taking responsibility for meeting service goals of the Department. In fact, even at the deputy director level, decisions must often be made by consensus since none of the deputy directors have full responsibility or control over service. Further, no deputy director has an overall perspective on priorities for any mode of service.

- Strategic decisions about service nearly always cross current division lines, requiring multiple participants in the decision-making process. When decisions are made below the deputy director level of the organization, these decisions are often made on an ad hoc basis instead of through a formalized decision-making process. As a direct result of this current structure, leaders in the decision-making process often emerge as a result of personality strengths, not necessarily because management has granted the individual any decision-making authority.

- Workers often view their roles within the organization in terms of the basic activities they perform. There is a limited sense of unity at the service level, ownership over the service that is provided by the Department, or accountability and responsibility for providing services. Although all of the activities performed by Operations and Maintenance employees are interdependent, the presence of separate divisions creates an artificial barrier which is only broken when individual managers and supervisors are skilled in their ability to cooperate and collaborate on resolving problems.

- The current organization requires and supports a parallel chain-of-command into the highest levels of the organization. At each yard, there are middle managers and supervisors assigned to both the Operations and Maintenance Divisions who must be successful collaborators if they are to ensure service availability and quality for the public. Because of the current organizational structure of the Department, workers within the Operations and Maintenance divisions become isolated from one another. This isolation is compounded because of the Department's high number of transit modes and operating locations.

Throughout this study, we became aware of instances when these organizational weaknesses became apparent by the actions of management. Accordingly, we believe that several examples demonstrated in this finding and throughout our report point to the need for the Public Transportation Commission and MUNI management to investigate alternative organizational designs in order to correct some of the existing problems with the management structure of the Department.

Observations of Decision-Making Processes

The Municipal Railway is a large and complex organization. The Operations Division must rely heavily on the other divisions if it is to be successful at meeting its primary goal of providing safe and reliable service. For example, if buses are not available because the Maintenance Division is unable to appropriately maintain the fleet, the effectiveness of the Operations Division is diminished.

The following discussion of events that occurred prior to or during the period of this study, are meant to illustrate how the current organization structure weakens the decision-making process. These examples are not intended to be a critical assessment of the performance of any individual or group of individuals within MUNI.

One Driver/One Bus: Section 1.6 of this report discusses the benefits from implementing a "One Driver/One Bus" system of vehicle assignment which, we believe, would create an environment where drivers and maintenance workers would be better able to work as a team to identify and resolve mechanical problems with vehicles. Such a program could be more effectively implemented if operators, maintenance workers, and mechanics were reporting to the same supervisor and had shared goals of providing passenger service, instead of the more narrow goals defined by specific job roles.

Subway Odors: Unidentified subway odors shut down the MUNI Metro System for two hours on March 29, 1996, during the morning commute. Passengers at the West Portal and Embarcadero stations had to be transferred to alternative diesel bus services. Although BART trains were operating in adjacent tunnels, their commute service was not interrupted. In part, the extended period that MUNI was shut down was due to a need to initiate multiple lines of communication between Operations, Maintenance, and the Director's Office, and difficulty obtaining a decision on whether to resume service. Although MUNI service should not have been resumed until management felt the tunnels were safe, the time required to make a decision could probably have been shortened had decision-making authority been more centralized.

Broken Signal Switch: A broken signal reported at 7:50 A.M. on March 11, 1996 in the Metro Tunnel resulted in the partial shut-down of Light Rail Vehicle operations at the Embarcadero Station. Maintenance technicians could not perform immediate diagnostic tests on the problem because they were busy performing manual switch over-rides for over an hour. The manual operation of switches could have been performed instead by station personnel but they were supervised by different managers. If both maintenance technicians and station personnel had been supervised under single management, the problem could have been resolved more expeditiously. Instead, it took over two hours for the maintenance crew to both operate the manual switches and perform trouble shooting.

Decisions Regarding BREDA Purchase: As discussed in Section 1.7 (Maintenance Engineering) and Section 4.1 (Capital Projects Management), decisions regarding the design of new light rail vehicles involved trade-offs between operational goals (e.g., reduction of dwell times for loading passengers) and facility considerations. Specifically, the new LRVs are longer in order to accommodate extra doors for faster boarding. The longer cars present problems because four-car trains do not fit at all stations, and the width necessitates reconstruction of doors at two storage and repair buildings. The design decisions for the new LRV may be sound, but our interviews with Maintenance Division and Safety staff indicate that there is considerable difference of opinion on the most appropriate resolution to the problems presented during the design phase of the project.

Graffiti and Vandalism: Whereas MUNI Maintenance was able to keep abreast of the removal of graffiti on buses with additional car cleaners, the Division was not able to readily replace windows which were vandalized by juvenile "taggers" when they found their graffiti had been removed. Greater coordination between Maintenance, Operations, and the San Francisco Police Department MUNI Transit Company could have saved additional costs necessary to replace broken windows.

Organization of Other Major Transit Properties

As part of this study, we contacted other major transit properties to obtain information regarding their management structure and the organization of their services.[1] The transit properties that responded to our request for this information included the:

- King County Department of Transportation (Seattle-Metro);
- Los Angeles Metropolitan Transportation Authority (Metro);
- Massachusetts Bay Transportation Authority, Boston (MBTA);
- New Jersey Transit (NJT);
- Pittsburgh-Allegheny Transit (PAT); and,
- Southeastern Pennsylvania Transportation Authority (SEPTA).

These transit properties represent six of the ten properties selected for comparison based on similarities with MUNI.

Seattle-Metro is both an urban and suburban transit property which provides approximately 37.7 percent of the passenger trips provided by MUNI. Pittsburgh-PAT is similar in size, complexity, and mode of operation as Seattle-Metro. Out of the respondent properties, these two are the only properties that are organized like MUNI, according to function. The other properties, are organized (1) according to general mode of service and, depending upon the area served, (2) geographical region. Characteristics of MUNI compared with these six other properties are displayed in Appendix 1.1. In general, the properties have:

(1) Integrated their vehicle custodial services and light maintenance under the division manager for each mode of service.

(2) Established central maintenance divisions for heavy repair for each mode of service. In other words, "Bus Operations" has a heavy maintenance unit dedicated to bus repair; "Rail Operations" has a similar heavy maintenance unit dedicated to the repair of light and/or heavy rail vehicles.

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[1] Appendix 1.1.1 includes a list of ten transit properties that we selected for comparison. These survey properties were selected based on the amount of service provided, as measured by total passenger trips; the number of transit modes operated by the property (e.g., motor bus, trolley bus, light rail, etc.); and, passenger trips per hour of service (revenue hour). Included in this list are: (1) all properties that operate trolley buses; and, (2) all properties that use light rail as a major mode of transportation. MUNI operates all modes, except commuter and diesel rail, which were excluded from the comparison with other properties. San Francisco also operates a cable car system, which is a transit mode unique to transit properties in the United States.

These divisions are generally viewed as support units from which heavy repair services are purchased by the operating divisions. Primary control over vehicles being serviced by the central maintenance facilities is retained by the individual operating divisions.

(3) Established central maintenance divisions responsible for maintaining all electrical, fixed guideway, and facilities infrastructure.

Although MUNI presently performs all of these functions, responsibility and accountability within the organization is narrowly defined. The Transit Manager III (9142) over Division Operations is responsible for managing Transit Manager I (9140) and Transit Manager II (9141) positions, who are responsible for scheduling and supervising vehicle operators at the divisions; while his counterparts in the Maintenance Division are responsible for supervising maintenance workers, mechanics, and technical/professional personnel at each division, organized according to sub-specialty (e.g., automotive maintenance, electrical maintenance, cable car and rail, power and structures, etc.).

The Mayor and the Board of Supervisors should consider an alternative organization structure which would be similar to that which exists at other transit properties. Establishing such an organization would provide an opportunity to:

- Create a management structure at the divisions that focuses responsibility, authority and accountability for providing services in a single manager. Currently, management at these locations is bifurcated between an operations and maintenance manager.

- Foster a customer service culture at each of the divisions by opening communications and interaction between operations and maintenance personnel. Employees would become an integral part of a management structure that has a specific goal of providing service, rather than just the subordinate goals of driving, cleaning, or maintaining vehicles.

- Streamline the organizational structure by reducing unnecessary duplication of managers and supervisors, and allowing the more effective utilization of personnel, in general.

We have not developed a specific organization structure which should be adopted by the Department of Transportation. Conducting a comprehensive analysis of the Department's organizational structure would require a major analysis beyond the scope or resources made available for this study. Further, the creation of an alternative organizational structure presents potentially significant labor relations issues which would need to be addressed in a meet and confer setting.

However, we believe that the potential benefits to be derived from a comprehensive review of the Department's organization are significant in terms of customer service, efficiency, and the opportunity for cost savings. We therefore recommend that the Public Transportation Commission schedule and conduct a series of workshops to investigate and establish an alternative organization structure more similar to that found at other major transportation properties.

Conclusions

The Municipal Railway's direct service activities are presently organized by the principal functions of Operations and Maintenance, with management and support activities performed by the Director's Office, Capital Programs, and Finance, Administration and Personnel. This organizational structure creates a system of management by specialty, but reduces accountability by service or product line (e.g., diesel, trolley, light rail, and cable car services).

Other large transit properties with multiple vehicle modes are organized according to general service. This organizational structure fosters management accountability while retaining suitable levels of technical specialty within the organization.

The Department and the Public Transportation Commission should consider alternative organizational structures for the Municipal Railway in order to increase management accountability, responsibility, and timeliness of decision making over major service modes.

Recommendations

The Public Transportation Commission should:

1.1.1 Schedule and conduct a series of workshops to examine the organization structure of the Department of Transportation. This examination should incorporate the organizational concepts employed by other major transit properties, with the goal of improving customer service with more focused management authority, responsibility, and accountability over operations and light maintenance activities.

Costs and Benefits

There would be no new cost to implement this recommendation.

The benefits from reorganizing the Municipal Railway could be significant in terms of customer service, efficiency, and cost savings. The amount of such savings cannot be quantified until specific organizational alternatives are developed by the Public Transportation Commission, and the results of meet and confer sessions with employee bargaining units are known.

1.2 Transit Operator Scheduling

- **The Municipal Railway has not developed a program to effectively manage transit operator staff. Position control is fragmented and weak, sick leave and workers compensation use is high, and the assignment of operators to non-driving duties is excessive.**
- **As a result, MUNI operators on driving status are required to work extended shifts, resulting in the scheduling of excessive non-productive hours and a high use of overtime. More importantly, this condition results in significant losses in direct service, which is expected to exceed 30,000 hours in FY 1995-96. Current scheduling practices also contribute to operator fatigue.**
- **By implementing an effective position control system and increasing the number of full-time and part-time operators who are physically able and available to drive, the Municipal Railway could reduce platform hour requirements, increase service reliability, and save approximately $1.1 million per year.**

Municipal Railway transit service schedules are changed periodically, and on a quarterly basis each platform operator signs-up for a run[1] based on his or her union seniority. Each run may require the operator to drive during the AM peak service period, the PM peak service period, or both (split runs). Runs may also include scheduled time-off during the day. Full-time platform operators are paid overtime for all hours required to be on-duty in excess of 10 hours (split time), even if total driving time is 8 hours or less.

Because of the unique character of transit service scheduling, the number of platform operators who are available to operate transit vehicles can have considerable impact on an agency's ability to provide scheduled service in an economical manner. By having fewer available platform operators than are required to provide policy levels of service:

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[1] A run is a portion of scheduled service to which transit operators are assigned. A run typically consists of multiple trips on one or more designated line.

- MUNI management cannot economically schedule some runs because an insufficient number of part-time operators are available. Instead, full-time operators are paid for greater amounts of nonproductive split time than would otherwise be necessary to operate the system with more part-time workers.

- MUNI must pay a greater amount of overtime than would otherwise be necessary if a sufficient number of operators were available. Some operators are required to work overtime shifts which otherwise would be paid at straight time to full-time and/or part-time operators.

Scheduled overtime, which includes split time and all other work time in excess of eight hours per day for platform operators, is currently averaging approximately $10.0 million annually, or 11.92 percent of current platform operator salary expenditures. This scheduled overtime includes all platform operator pay which is built into individual runs, paid at a premium time and one-half rate. An additional $7.4 million, or 8.4 percent of current expenditures, is currently paid for unscheduled overtime for platform operators. This unscheduled overtime is required to cover scheduled runs when regularly scheduled operators are in training, performing special duty assignments or on leaves of absence. In total, over 20 percent of Platform Operator salaries expenditures are for overtime.

In addition, discussions with representatives from the Municipal Railway indicate that working additional hours and days in order to provide scheduled service can contribute to operator fatigue.

Current Numbers of Platform Operators

MUNI currently maintains three independent sets of records on platform operators. (1) MUNI has a Personnel Department within its Finance, Administration and Personnel Division which processes paperwork for all new employees, and paperwork for each change of status for existing employees until separation from MUNI service. (2) The MUNI Payroll Section maintains a separate set of records on all employees on MUNI's active payroll. (3) The MUNI Operations Division maintains a set of records which contains data on operators who participate in the quarterly sign-up for runs. This data is updated each week between sign-ups.

Changes in individual operator employment status and assignment status are numerous and are made separately in each system as written documentation is received. These systems are not interactive, and the information is not shared or routinely reconciled either electronically or manually. None of the three systems contain comprehensive data on all MUNI operators. As shown below:

- The Personnel Department has minimal information on all employees from the date of hire to the date of separation.
- The Payroll Section has complete information on employees who are receiving pay, but does not have complete information on employees who are on unpaid status (e.g., leave without pay).
- The Operations Division has complete information on employees who are eligible to participate in the quarterly sign-ups, but does not have complete information on operators who may be in training, on long-term leave, on special duty assignment, or in the process of separation from MUNI service.

We researched the number of platform operators known to MUNI management using information available from these sources. A description of the results of this research is provided below.

As a first step, we made an inquiry to the Personnel Department on April 18, 1996, and were provided the following information on the employment status of platform operators:

Table 1.2.1

Salary Ordinance and Summary Personnel Records on the Number of Full-Time and Part-Time Transit Operators San Francisco Municipal Railway-April 1996

	Full-Time Operators	Part-Time Operators	Total Operators
Authorized Positions (Annual Salary Ordinance)	1,833	0	1,833
Additional Position Requisitions Authorized By Mayor & Controller[2]	50	0	50
Authorized Positions In MOU[3]	0	220	220
Total Authorized Positions	1,883	220	2,103
Positions Filled in May 1996	1,836	197	2,033
Positions Vacant in May 1996	47	23	70

We then obtained a listing of the platform operators who had participated in the most recent April 7, 1996 sign-up in order to compare available operators with authorized and filled positions which were reported to us by the Personnel Department. "Participation" in the sign-up is defined by MUNI to include any Platform Operator who is eligible to operate a transit vehicle (e.g., excludes trainees, long-term industrial injury, etc.), whether or not the operator actually signed-up for a run. Based on analysis of this Operations Division listing, 2,204 platform operators, or 171 more than the 2,033 identified by the Personnel Department had participated in the April 7 sign-up.

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[2] The Mayor and the Controller have administratively authorized an additional 50 full-time positions in order to provide replacement positions for platform operators who occupy a position while on long-term disability.

[3] Although part-time positions are not enumerated in the budget or annual salary ordinance, 220 part-time positions are permitted by the MOU with Transit Workers Union Local 250A, and are funded from the MUNI salaries budget.

Because of these significant discrepancies, we then went back to the Personnel Department, and requested and received a detailed listing of all active and inactive platform operators. We compared this detailed listing with the listing of operators participating in the most recent sign-up. Again major differences were identified since this detailed Personnel Department listing contained additional employees who had not participated in the April 7, 1996 sign-up.

While some of these operators were in the process of being separated from MUNI service due to resignation or retirement, 37 were considered active employees. Of these 37 employees, 32 were enrolled in new operator training, two were on industrial injury, and three were reportedly active and assigned to divisions, but did not participate in the April 7, 1996 sign-up. Therefore, after reviewing our analysis with Department staff, we were able to determine that a total of 2,241 full-time and part-time employees either participated in the April 7, 1996 sign-up, or were actively employed by the MUNI. The full results of our analysis are presented below.

Table 1.2.2

Comparison of Department Records on Numbers of Full-Time and Part-Time Transit Operators San Francisco Municipal Railway-April 1996

	Full-Time Operators	Part-Time Operators	Total Operators
Authorized Positions	1,883	220	2,103
Personnel Count of Filled Positions	1,836	197	2,033
Employees Participating in Sign-up	1,988	216	2,204
Over (Under) Authorized Positions	105	(4)	101
Over (Under) Filled Position Count	152	19	171
Employees in Detailed Listing[a]			2,241
Over (Under) Authorized Positions			138
Over (Under) Filled Position Count			208
Employees Signing-up April 6, 1996	1,696	186	1,882
Over (Under) Participants	(292)	(30)	(322)
Over (Under) Detailed Listing			(359)

[a] Records obtained from the Department did not allow us to distinguish between full and part-time, employees when conducting this segment of the analysis.

The discrepancies discovered during this analysis demonstrate that MUNI's records are inconsistent and do not present a clear picture of the platform operator work force. Once a more representative staffing profile is developed, it becomes clear that MUNI:

- Employs many more operators than are authorized by the Board of Supervisors, included in the MOU, or agreed to by the Mayor and the Controller to replace employees of long-term industrial injury leave. During the period of our study, the Department employed 138 Platform Operators more than are authorized in the Salary Ordinance.

- Despite this "over-employment" of personnel, the Department is still unable to meet its vehicle scheduling needs with regularly scheduled personnel, requiring the use of excessive overtime averaging over 20 percent of all paid time in FY 1995-96. In the first half of FY 1995-96, over 15,000 hours of service were missed due to "No Operator." This equates to a rate of 6.9 percent of all service, or more than 30,000 hours of missed service per year.

Based on the detailed staffing analysis conducted in this Section and in Section 2.1 on the use of Special Duty Operators, many Platform Operators are "passing" during the sign-up due to their status on long-term industrial injury or sick leave, or because they have been administratively reassigned to non-driving duties within the Department. These issues are discussed more fully below.

Clearly a centralized position control system is needed as a first step for providing MUNI management with comprehensive and accurate information on the number of platform operators available for scheduling purposes, for use in developing and monitoring the budget to insure that salary accounts are not over-expended, and for ensuring compliance with the City's salary ordinance. While in recent years, MUNI has not exceeded the budgeted appropriation for operator salaries, the FY 1995-96 amount is currently projected to be over expended by approximately $1.3 million. It should be noted that the Mayor's budget fiscal year 1995-96 budget included a budgetary reduction in the Platform Salaries appropriation in amount of $2.5 million which was identified as "Object 9995 Positions Not Detailed." This budgeted salary reduction has been eliminated in the FY 1996-97 Budget.

Platform Operators In Inactive Status

Although MUNI has over 100 more operators on its payroll than have been authorized--and more than are required to meet scheduled service--in practice, so many operators are not on active, driving duty that MUNI actually has a serious shortage of operators.

In addition to platform operators who are on active status and ready to work as assigned (termed "driving drivers" by MUNI management), at any time there is a large number of operators that are still in training; on extended sick leave, leave without pay, industrial injury, or workers compensation; assigned to non-driving special duties; or on suspension.

Operators who are still in training are ineligible to participate in the sign-up. Other operators who are on extended leave, light duty or suspended, are temporarily ineligible to sign-up for a run and therefore participate, but must pass until a future sign-up (an exception is made for operators with medical conditions which the operator's doctor expects to be cleared by the effective date of the sign-up). Still other operators may "pass" on the sign-up because they have been administratively reassigned to non-driving duties within the Department.

Therefore, although we identified 2,241 operators on the detailed employee listing who should have been available for the April 6, 1996 sign-up, only 1,882 platform operators actually signed-up for a run.[4] This was 359 fewer than the approximate number who were employed by MUNI at the time. Thus over 350 platform operators were either ineligible for the sign-up due to training or suspension status, or were on long-term leave which prevented their availability for the sign-up. A summary of the 1,882 platform operators who participated in the sign-up is provided below:

Table 1.2.3

Number of Full-Time and Part-Time Transit Operators Participating in the April 6, 1996 Sign-up San Francisco Municipal Railway

	Regular Operators	Extra Board Operators	Total Operators
Full-Time Operators	1,379	317	1,696
Part-Time Operators	159	27	186
Totals	1,538	344	1,882

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[4] Because the date of the sign-up and the personnel listing are not consistent, the difference between total platform operators employed by MUNI and those available for sign-up may differ from this approximation.

Accordingly, we were able to identify only 1,696 trained and available full-time platform operators for the sign-up, which is 84 less than the 1,780 full-time operators specified in the MOU as being necessary to provide scheduled service. The number of part-time operators was 186, or 34 less than the 220 part-time operators currently permitted by the MOU to supplement full-time operator work hours.

Impact of Insufficient Driving Drivers on MUNI Scheduling and Costs

An analysis of the sign-up data available for recent years shows that the number of full-time operators available for sign-up has decreased by 25 from 1,404 to 1,379; and the number of part-time operators available for sign-up has decreased by 25 from 184 to 159 from October 1988 to April 1996 (excludes Extra Board operators). During this same time period, the ratio of scheduled weekly vehicle hours to weekly pay hours has increased from 1.203 to 1.214 as follows (an increase of 0.9 percent):

Table 1.2.4

Growth in the Ratio of Pay Weekly Pay Hours to Weekly Vehicle Hours - 10/1/88 through 4/6/96 San Francisco Municipal Railway

Sign-up Date	Full-time Operators	Part-time Operators	FTE Operators	Pay Hours Weekly	Vehicle Hours Weekly	Pay Hours To Vehicle Hours
10/1/88	1,404	184	1,519	71,587	59,517	120.28%
4/1/89	1,404	202	1,530	71,720	59,527	120.48%
6/24/89	1,401	183	1,516	71,136	59,137	120.29%
9/2/89	1,399	183	1,514	71,734	59,620	120.32%
1/6/90	1,398	170	1,504	71,947	59,831	120.25%
3/31/90	1,407	184	1,522	72,551	60,206	120.50%
1/5/91	1,391	184	1,506	72,458	60,169	120.42%
3/28/92	1,392	197	1,515	72,599	60,242	120.51%
6/20/92	1,375	181	1,488	72,008	59,593	120.83%
3/27/93	1,370	184	1,485	72,772	60,087	121.11%
1/1/94	1,373	189	1,491	73,104	60,203	121.43%
1/28/95	1,372	185	1,488	72,806	59,918	121.51%
12/31/95	1,382	159	1,482	72,603	59,884	121.24%
4/6/96	1,379	159	1,479	72,743	59,921	121.40%

This trend has occurred because of a decrease in the number of full-time and part-time operators available for scheduled service. The number of full-time and part-time operators available for scheduled service decreases if the following occurs:

- A greater number of operators are on long-term sick leave, industrial injury or leave without pay.
- A greater number of operators are on light duty status.
- A greater number of operators are assigned to non-driving special duty assignments.

As previously noted the Memorandum of Understanding between the City and the Transport Workers Union requires an available operator force of not less than 1,780 full-time operators for current levels of scheduled service. The Annual Salary Ordinance for fiscal year 1995-96 authorizes a total of 1,833 Platform Operator positions. Although the Department currently exceeds this authorization, due to the number of operators on extended leave, in light duty status, or assigned to non-driving special duties, the actual number of operators available for sign-up is currently less than the 1,780 required for optimal scheduling.

Scheduling efficiencies and reduction in costs can be achieved within the constraints of the MOU by increasing the number of available part-time positions to the 220 allowed by the MOU, and by increasing the number of available full-time positions to the 1,780 identified in the MOU. This objective can be accomplished by implementing the following two step plan:

(1) Reduce the number of special duty officers assigned to non-driving duties. A comprehensive assessment of our recommendations in this area is contained in Section 2.1 of this report, where we have identified the equivalent of more than 88 full-time employees who were working in a special duty capacity during the period of this report.

(2) Aggressively implement an Integrated Safety and Loss Prevention Program, such as the one proposed by MUNI in March 1996. Combined with savings from projected reductions in Workers Compensation claims and costs, the increased availability of platform operators will significantly offset projected costs from implementation of such a program.

These efforts should substantially increase the number of available drivers without increasing the payroll. Once the recommendations have been fully implemented, the Department should determine whether any additional full-time operator positions are necessary to efficiently fulfill transit scheduling requirements.

The current operator employment practices of the Department violates the Salary Ordinance, and the limits of the administrative authorization to exceed the salary ordinance by 50 positions in order to compensate for employees on long-term leave. This situation should be corrected based on a re-evaluation of MUNI's operator staffing needs. However, the budget for platform operator salaries should still be reduced by approximately $1.1 million to reflect savings that will be achieved by reducing nonproductive split-time pay and overtime.

Conclusions

The Municipal Railway has not developed a program to effectively manage transit operator staff. Position control is fragmented and weak, sick leave and workers compensation use is high, and the assignment of operators to non-driving duties is excessive.

As a result, MUNI operators on driving status are required to work extended shifts, resulting in the scheduling of excessive non-productive hours and a high use of overtime. More importantly, this condition results in significant losses in direct service, which is expected to exceed 30,000 hours in FY 1995-96. Current scheduling practices also contribute to operator fatigue.

By implementing an effective position control system and increasing the number of full-time and part-time operators who are physically able and available to drive, the Municipal Railway could reduce platform hour requirements, increase service reliability, and save approximately $1.1 million per year.

Recommendations

The Director of Public Transportation should:

1.2.1 Develop a proposal to purchase or develop a centralized personnel information system for maintaining all employee information. This system should include a position control element.

1.2.2 Request a supplemental appropriation to provide funding for the implementation of the proposed centralized personnel information system.

1.2.3 Develop historical averages of the number of operators who are unavailable for driving due to extended leave and other factors.

1.2.4 Implement detailed recommendations in Section 2.1 of this report to reduce the number of operators assigned to non-driving special duties.

1.2.5 Provide the Public Transportation Commission with a quarterly list of operators assigned to non-driving duties, their assignment, and the reason the assignment is of a higher priority than driving.

1.2.6 Seek approval and funding for the Integrated Safety and Loss Prevention Program developed by the Department in March 1996.

12.7 Report to the Public Transportation Commission quarterly regarding the number of employees unavailable for driving duties due to sick and industrial leave status.

1.2.8 After implementing recommendations 1.2.1 through 1.2.7, above, request an amendment to the City's Annual Salary Ordinance to increase full time operator positions to correspond with actual practice.

1.2.9 Increase the number of part-time platform operators to the 220 maximum allowed by the present MOU as soon as sufficient operators complete the necessary training.

Costs and Benefits

Implementation of the Integrated Safety and Loss Prevention Program, as proposed by the Department, would result in annual costs of approximately $1.3 million per year. However, these costs will be offset by reductions in the cost of Workers Compensation claims and increased scheduling efficiencies described in this finding.

The cost of a computerized position control system is unknown at this time. However, such a system would be cost effective if it is microcomputer or minicomputer based, reduces the need for duplicative data entry and record management, and improves management's ability to control operator costs.

By consolidating platform operator personnel records into a centralized position control system, the MUNI would have more accurate information on the status of each individual operator and the total number of operators available for sign-up.

Implementation of an effective position control system would also provide MUNI management with improved information for use in developing the MUNI budget and in monitoring the budget to insure that salary accounts are not over-expended.

By implementing all of the recommendations contained in this Section, the Municipal Railway can reduce its platform hour requirement, resulting in reduced costs estimated to be $1.1 million annually.

1.3 LRV Second Operators

- **The Municipal Railway currently schedules platform operators for duty in all Light Rail Vehicle (LRV) cars that are placed into passenger service.**
- **Scheduling operators in the second, third and fourth cars of multiple LRV trains is an inefficient use of staff resources.**
- **Implementation of a Proof-of-Payment Program with the addition of 37 positions at an annual cost of between $1,324,178 and $1,591,181, would result in increased efficiencies, more expeditious passenger boarding, and net annual savings of as much as $2.1 million.**

MUNI currently assigns a platform operator on every light rail vehicle (LRV) car placed into passenger service, including vehicles that are the second, third and fourth cars of multiple LRV trains. Generally, these operators are assigned to these cars to collect fares from riders. The cost for platform operators is the largest cost category for MUNI. Therefore, transporting the most possible passengers with the least platform operator cost is a desirable objective.

MUNI presently has an opportunity for reducing platform operator costs by scheduling platform operators for only the lead car in multiple car trains. However, eliminating platform operators from the second, third and fourth cars requires alternate means for insuring that appropriate fares are paid by passengers.

In order to insure that LRV passengers pay appropriate fares under a system with only a lead car operator, MUNI would be required to implement a Proof-of-Payment program (POP). Such a program would require that each passenger show, upon request, proof that payment has been made to MUNI. Proof-of-payment could consist of a valid pass, transfer, or fare receipt. Citations would be issued to passengers who have boarded LRVs and are unable to show proof-of-payment to appropriate authorities.

The implementation of a Proof-of-Payment Program has been recognized by the Municipal Railway as a means for reducing operating costs and improving services by decreasing vehicle load times. Accordingly, the Municipal Railway and the SFPD MUNI Transit Company implemented a pilot program from which to gauge the potential benefits from a Proof-of-Payment Program.

Proof-of-Purchase Pilot Program Results

The Municipal Railway has constructed high-level platforms on 19th Avenue at Holloway and Winston Avenues. As part of the pilot program to evaluate the effectiveness of a POP Program, the San Francisco Police Department MUNI Transit Company has conducted periodic inspections of these stations since December, 1994, to determine whether passengers possess valid proof of payment. However, the police have only been able to inspect about one to two percent of all boarding passengers. MUNI estimates that fare evasion is about 25 percent of cash fares at these locations, or approximately five to six percent of total fares.

Light-duty platform operators are also being used to limit access to these high-level platforms to those passengers showing proof of payment. Based on the results of this pilot program, the Municipal Railway estimates that a fully implemented Proof-of-Payment Program, with an inspection rate of between 15 percent and 20 percent of passengers, would reduce fare evasion on the LRV system to acceptable levels. This is consistent with estimates made by other transit properties that have implemented proof-of-payment programs on their LRV and rail systems.

Implementing a System-Wide POP Program

Presently passengers can only board LRVs by the front door when the LRVs are being operated on surface streets. Implementation of a full Proof-of-Payment program would allow MUNI to eliminate the Platform Operators in the second, third and fourth cars of multiple LRV trains and allow the use of all doors on the LRVs, which would expedite boarding of passengers. Boarding through all doors would also allow for safer and more convenient boarding, better load distribution, and faster run times.

In addition to the high-level platforms on 19th Avenue at Holloway and Winston Avenues, the Municipal Railway plans to construct similar high-level platforms on the MUNI Metro extension. Front door-only boarding at these high-level platforms during peak periods would result in seriously degraded schedule adherence, based on the projected ridership which is expected to originate from Mission Bay.

Full implementation of a Proof-of-Payment program would require passengers to show proof-of-payment to police officers, other law enforcement officers, or designated Municipal Railway employees throughout the entire LRV system. While the inspection function could be performed by contract security personnel or by uniformed officers of the Police Department or the Sheriff's Department, the use of uniformed Municipal Railway inspection personnel is recommended as the most cost effective means of fully implementing the Proof-of-Payment Program. Systems using civilian personnel with police back-up have successfully worked in other jurisdictions. For example, the Chicago Transit Authority (CTA) is presently implementing an expanded program of Proof-of-Payment inspection and service quality assurance using light duty, and permanently disabled and retrained vehicle operators.

The estimated cost of a civilian Proof-of-Payment inspection program managed directly by MUNI is illustrated below:

Table 1.3.1

Estimated Cost of a Civilian Proof-of-Payment Inspection Program San Francisco Municipal Railway - May 1996

Position Title	No. of Positions	Minimum Annual Salary	Maximum Annual Salary
Senior Inspector	5	$159,993	$193,662
Inspector	30	800,226	968,571
Senior Clerk Typist	1	28,814	34,870
Clerk Typist	1	26,309	31,842
Estimated Fringe Benefits		253,836	307,236
Overtime		30,000	30,000
Uniforms and Other Costs		25,000	25,000
Total	37	$1,324,178	$1,591,181

The Municipal Railway Scheduling Division estimates that savings from platform operator salaries will be approximately $2,600,000 to $3,700,000 annually after full implementation of a system-wide Proof-of-Payment Program. We have reviewed the assumptions used by MUNI and concur. Additional operator hours could be used to provide regularly scheduled service at reduced cost (see Section 1.2).

Based on the estimated operating costs shown in the table above, net savings from the implementation of the Proof-of-Payment Program would therefore be between approximately $1,275,822 to $2,108,819 annually. During the first year of the Proof-of-Payment operation, the Municipal Railway would incur additional one-time costs for public outreach, training, travel and court tracking estimated at approximately $104,000.

In 1991, the Municipal Railway and the Transport Workers Union, Local 250A, agreed that "Before the Proof of Payment system of fare collections is implemented on the LRVs, GMPUC will meet and confer with Local 250A as to the proposed action. No Proof of Payment fare collection system will be introduced on the MUNI system before there is a fully developed security system operating on the LRVs." Since 1991 the SFPD and the Municipal Railway has taken the following actions to improve safety of Platform Operators and MUNI passengers:

- Increased the number of officers dedicated to crime prevention and law enforcement activity on MUNI vehicles, and at stations and stops, by over 100 percent. Current SFPD direct expenditures for the MUNI Transit Company exceeds $3.6 million per year, and is supplemented throughout the system by police officers from district stations.

- Implemented a MUNI Vehicle Inspection Program, whereby police officers from the district stations are required to randomly ride MUNI vehicles at least once per shift.

- Implemented a civilian monitoring system, whereby civilian volunteers monitor troublesome and criminal activity aboard MUNI vehicles, intervene if safe, and request police assistance if necessary.

- Enhanced coordination with the San Francisco Unified School District (SFUSD) to prevent juvenile crime on MUNI vehicles.

- Established improved SFPD, SFUSD, and MUNI protocols for responding to crime at schools and on MUNI vehicles.

- Implemented improved MUNI crime reporting mechanisms.

In addition, we believe recommendations contained in Section 1.4 and Section 6.1 of this report will further enhance MUNI security at stations and on board transit vehicles; and, the proposed use of uniformed Municipal Railway inspectors to enforce Proof-of-Payment regulations will enhance safety on the LRV system. The use of these inspectors to perform Proof-of-Payment inspections will allow the SFPD to concentrate on preventing crime and protecting operator and public safety on the transit system.

As will be discussed extensively in Section 6 of this report, we believe the current security system on the Municipal Railway's LRVs is sufficiently developed, and that MUNI has met the requirement specified in the 1991 agreement with TWU Local 250A. Further, given the average daily ridership of over 750,000 persons on MUNI, we generally conclude that the MUNI environment is statistically safe for most individuals who travel on the system. The analysis supporting this conclusion is provided in extensive detail in Section 6.1 of this report.

Conclusions

The Municipal Railway currently schedules platform operators for duty in all Light Rail Vehicle (LRV) cars that are placed into passenger service.

Scheduling operators in the second, third and fourth cars of multiple LRV trains is an inefficient use of staff resources.

Implementation of a Proof-of-Payment Program would result in increased efficiencies, more expeditious passenger boarding, and annual savings of as much as $2.1 million.

Recommendations

The Director of Public Transportation, and other appropriate City and County managers, should:

1.3.1 Meet and confer with the Transport Workers Union, Local 250A, regarding the implementation of a full Proof-of-Payment Program.

1.3.2 Request a supplemental appropriation for 37 positions, costing between $1,324,178 and $1,591,181, which would provide funding for the implementation of a Proof-of-Payment Program.

1.3.3 Request amendments to the City's Annual Salary Ordinance which would provide authorization to staff the Proof-of-Payment Program.

1.3.4 Reassign operators from duty on the second, third, and fourth cars of multiple LRV trains to active driving assignments, to improve MUNI's ability to meet scheduled service requirements.

Costs and Benefits

Implementation of a Proof-of-Payment Program would result in more expeditious boarding of passengers and a net savings estimated to be as much as $2.1 million annually.

1.4 Transit Service Supervision

- **The number of budgeted fixed post and mobile transit supervisor positions has steadily decreased from a high of 95 in FY 1981-82 to 64 in FY 1995-96. Yet the need for street supervision to sustain schedule adherence is apparent.**
- **During random corner checks performed by our study team, we found that only 62 percent of MUNI vehicles adhere to their published schedules, as compared with a service goal of 85 percent established by the Department. We also observed that the time between service could be doubled at specific stops if coaches ran late or early. We also found that approximately eight percent of motor coaches pull-in to the yards prior to their last scheduled passenger service stop.**
- **By increasing the number of transit supervisors, adjusting transit schedules to conform with operator and equipment resources, and by regularly employing random line supervision techniques, MUNI can enhance transit services and schedule adherence.**

The mission of the Transit Service Supervision Unit is to supervise the daily transit control activities of the Municipal Railway through a field supervision system. The Transit Service Supervision Unit is authorized a total of 71 positions, including one Chief Inspector, five Assistant Inspectors, two clerical support positions, and 64 inspectors. Currently, two of the Assistant Chief Inspector positions are vacant, due to assignment of those two staff persons to Transportation Superintendent duties.

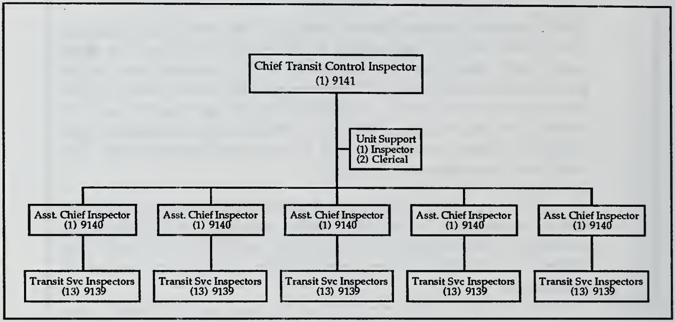
Transit Service Inspectors are deployed in two types of shift assignments: (1) to one of 19 "fixed post" locations throughout the City where several transit lines pass; and, (2) to one of nine "mobile" assignments based on geographical districts of varying size and service density. The fixed posts are located at the terminal points of lines, such as at the Transbay Terminal, and at intersections served by a high number of lines or lines of high service use. A few fixed post transit service supervisors are assigned a patrol vehicle for emergency response in the larger patrol districts.

An organization chart of the division is provided in Exhibit 1.4.1 on the following page. Current fixed post and mobile deployment assignments are shown in Appendix 1.4.1.

Exhibit 1.4.1

Organization of the Transit Service Supervision Unit

San Francisco Municipal Railway - May 1996


Chief Transit Control Inspector
(1) 9141
Unit Support
(1) Inspector
(2) Clerical
Asst. Chief Inspector
(1) 9140
Asst. Chief Inspector
(1) 9140
Asst. Chief Inspector
(1) 9140
Asst. Chief Inspector
(1) 9140
Asst. Chief Inspector
(1) 9140
Transit Svc Inspectors
(13) 9139
Transit Svc Inspectors
(13) 9139
Transit Svc Inspectors
(13) 9139
Transit Svc Inspectors
(13) 9139
Transit Svc Inspectors
(13) 9139

The primary duty of MUNI's transit supervisors is transit line management. This function increases transit vehicle adherence to service schedules by the following activities:

Exhibit 1.4.2

Listing of Transit Service Management Activities

San Francisco Municipal Railway - May 1996

Headway Adjustments
Switchbacks
Deadheads
Route Changes
Shuttle Service
Re-Routing
Provide Public Information

Trouble Shooting
Accident Investigations
Citing and Towing
Vehicle Trades
Conflict Resolution
Line Checks
Load Assignments (e.g., school field trips)

In addition to these transit line management activities, the mobile units are often used to transport drivers and mail between MUNI facilities.

Staffing History

Between FY 1982-83 and FY 1995-96, the number of Transit Service Supervisor positions was reduced from 95 to 64, as shown below:

Table 1.4.1

Budgeted Transit Service Supervisor Positions FY 1982-83 through FY 1993-94 San Francisco Municipal Railway

FY 1982-83	FY 1985-86	FY 1986-87	FY 1993-94
95	93	75	64

According to the incumbent Chief Transit Control Inspector, who has occupied that position since 1975, the staff reductions were imposed as a result of budget decisions made by MUNI management, and were not based on the Division's workload or on an identified reduction in the need for transit supervision.

Transit Service Schedule Adherence

In order to obtain an independent assessment of MUNI transit schedule adherence, we conducted a total of 207 schedule adherence checks at three different "corner check" locations in the City. The corner checks were conducted during both weekday AM and PM peak transit periods, the weekday base period, the weekday Owl Service, on a Saturday, and on a Sunday. These checks do not provide a statistically valid sample for determining schedule adherence, which would require a monitoring effort beyond the scope of this audit.

In total, we conducted checks on eight different lines for 207 coaches, as shown in the table on the next page.

Table 1.4.2

Results of Transit Service Corner Check Observations San Francisco Municipal Railway-April 1996

Schedule Category	Coaches	Percentage
On Time: Within +1 to -3 minutes of schedule	129	62.4
More than 3 but less than 6 minutes late:	28	13.5
6 or more minutes late:	25	12.1
More than 1 but less than 6 minutes ahead:	12	5.8
6 or more minutes ahead:	3	1.4
Coaches not out or disabled during checks:	10	4.8
Total	207	100.0

The results of this observation are further summarized below:

• On Time:	62.4 Percent
• 4 or more minutes late:	25.6 Percent
• 2 or more minutes ahead	7.2 Percent
• Coaches not-dispatched	4.8 Percent

Schedule adherence was particularly poor on the 2 (Clement) Line on the Sunday corner check, which was conducted at the intersection of Fillmore and Sutter between approximately 2:30 PM and 3:45 PM on Sunday, April 7, 1996. Because of the reduction in street supervision over the years, the Fillmore/Sutter intersection, which provides line management for Lines 2, 3 (Jackson), and 22 (Fillmore), is no longer a staffed fixed post. Therefore Lines 2, 3, and 22 are no longer supervised. The results of that "corner check" are provided on the next page.

Table 1.4.3

Results of Line 22 Corner Check Observations San Francisco Municipal Railway-April 7, 1996

Line No.	Run No.	Scheduled Inbound	Actual Inbound	Scheduled Outbound	Actual Outbound
2	662			2:30	2:37
2	686			2:45	2:40
2	703	2:23	2:37	3:00	3:15
2	707	2:38	2:56	3:15	3:26
2	623	2:53	2:57	3:30	3:27[1]
2	700	3:08	Not Dispatched		
2	662	3:23	3:27		
2	686	3:38	3:42		

The "headways"[2] on Line Number 2 are 15 minutes for the day and time-of-day monitored. However, Run No. 686, which had a scheduled outbound time of 2:45 p.m., had an actual outbound time of 2:40 p.m.[3] The next run on Line 2, Run No. 703, was running fifteen minutes late, probably due at least in part to the effects of having to pick up the passengers that missed Run No. 686. Thus, a transit passenger arriving at the Fillmore/Sutter outbound stop to catch Run No. 686 at 2:45, just prior to that time, would have had to wait until 3:15 to board Run. No. 703.

Run No. 707 was running late by eighteen minutes, arriving at the Fillmore/Sutter intersection at 2:56 p.m. Run No. 623, which is Run No. 707's "follower," was running late by only four minutes and thus arrived at the Fillmore/Sutter intersection at 2:57 p.m., one minute behind its "leader." Since the next inbound run, Run No. 700 was not dispatched due to the unavailability of an operator, there was a period of 30 minutes between Run No. 623 and Run No. 662, the next inbound coach on Line No. 2.

We believe that the lack of schedule adherence is a direct result of no supervision. Our conclusions are based on the following factors:

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[1] Run No. 698, which relieved Run No. 623.

[2] "Headways" refers to the length of time between runs.

[3] The practice of running ahead of schedule is known as "running sharp," and is strictly forbidden by MUNI rules without permission to do so for extraordinary circumstances. "Running sharp" can cause a myriad of problems for a transit line, particularly for the transit vehicle following the vehicle running sharp.

(1) Transit operators endeavor to adhere to schedules when they know that the line is being managed.

(2) When incidents occur that adversely affect schedule adherence, such as blocked streets or equipment malfunctions, the Transit Service Inspector can take action to alleviate the disruption to service, using switchbacks or one of the other management techniques discussed previously.

To enlarge the population on which to base our assessment of MUNI schedule adherence, we reviewed the results of service evaluations performed by the Transit Service Supervision Organization in August, September, and October of 1995. Those service evaluations included schedule adherence checks of 1,899 coaches from 14 transit lines. The results of the service evaluation are shown below.

Table 1.4.4

Results of Transit Service Supervision Organization
Corner Check Observations - August through October, 1995
San Francisco Municipal Railway

Schedule Category	Coaches	Percentage
On Time: Within +1 to -3 minutes of schedule	1,356	71.5
More than 3 but less than 6 minutes late:	150	7.9
6 or more minutes late:	182	9.6
More than 1 but less than 6 minutes ahead:	92	4.8
6 or more minutes ahead:	27	1.4
Coaches not out or disabled during checks:	92	4.8
Total	1,899	100.0

The results of the observation by the Transit Service Supervision Organization are further summarized below:

• On Time:	71.5 Percent
• 4 or more minutes late:	17.5 Percent
• 2 or more minutes ahead	6.2 Percent
• Coaches not-dispatched	4.8 Percent

MUNI publishes a document titled the "Short-Range Transit Plan," which includes goals and objectives on providing transportation services. Goal Number 3 is to "Provide Service That Is Dependable." Objective 3.5 under Goal Number 3 is to "Provide dependable service that runs on schedule." The Standard for that objective is "85% of trips no more than one minute ahead of schedule or three minutes late." Based on our observations, service evaluations performed in August, September, and October of 1995 by the Transit Service Supervision Organization, and by the assertions of some of MUNI's riders, the Department is not meeting its objective of providing dependable service that runs on schedule.

Another indication of poor line management is when transit vehicles on the same line run in very close proximity to one other, not maintaining scheduled headways. For example, we observed three coaches on the 21 Hayes Line running in tandem on Wednesday, April 24, 1996, at 2:26 P.M., at the intersection of Hayes and Gough Streets. Two of the coaches were in the bus stop zone simultaneously and the third was across the intersection waiting for a green light, the first vehicle in its lane. We checked with Central Control and determined that there had been no activity reported that qualified for an entry in the daily log. The scheduled headway for the 21 Line at the time of our observation is ten minutes. A listing of the coach numbers and run numbers observed is contained in our working papers.

"Pull-in-Time" Schedule Adherence

MUNI publishes schedules entitled "Vehicle Pull-In-Rotation" that show the time that each run is due back in the yard after completing the day's trip. The schedule also shows the time the run is to be at its last passenger pick-up location (last node), and the location of the last node. In order to obtain an indication of adherence to pull-in-time schedules, we observed pull-ins at three separate transit divisions on three separate days. The results of those observations are as follows:

Table 1.4.5

Results of Transit Vehicle Pull-In Observations
San Francisco Municipal Railway - April 1996

Schedule Category	Coaches	Percentage
Within +3 to -5 minutes of schedule:	52	32.9
More than 5 but less than 10 minutes late:	20	12.7
10 or more minutes late:	36	22.8
More than 3 but less than 6 minutes ahead:	19	12.0
6 to 10 minutes ahead:	12	7.6
More than 10 minutes ahead:	19	12.0
Total	158	100.0

The results of our observations are further summarized below:

• Within +3 to -5 minutes	32.9 Percent
• 6 or more minutes late:	35.5 Percent
• 4 or more minutes ahead	31.6 Percent

The observations reported above indicate that adherence to scheduled pull-in-times is generally poor. Approximately 35.5 percent of the observed pull-ins were six or more minutes late, skewed significantly by our Kirkland observation. The yard controllers at that location informed us that late pull-ins are typical due to heavy traffic in the area. Pull-in schedule adherence is particularly poor when Bay Bridge traffic is heavy and backs onto City streets.

However, approximately 31.6 percent of the pull-in-times observed were four or more minutes ahead of schedule. In fact, many coaches arrived well before the last scheduled node for the run. At observations conducted at the Flynn and Kirkland diesel bus yards, this was very apparent.

Table 1.4.6

Results of Transit Vehicle Pull-In Observations Occurring Prior to Last Scheduled Node: Flynn and Kirkland Diesel Bus Yards San Francisco Municipal Railway - April 1996

(All Times P.M.)

Line	Coach	Run	Scheduled Last Node	Scheduled Arrival	Observed Arrival	Difference Last Node	Difference Arrival
Flynn, April 9, 1996							
9	6053	482	7:00	7:15	6:51	9m	24m
38	9107	489	7:07	7:30	6:57	10m	33m
9	9103	478	6:51	7:06	6:30	21m	36m
15	6022	457	6:23	6:38	5:59	24m	39m
14X	6064	465	6:28	6:43	5:59	29m	44m
Kirkland, April 19, 1996							
42	8805	685	6:56	7:10	6:54	2m	16m
27	8825	695	7:15	7:25	7:12	3m	13m
1X	4679	681	6:30	6:48	6:22	8m	36m
32	4618	835	6:47	6:49	6:39	8m	10m
39	9003	677	6:24	6:26	6:15	9m	11m
42	4606	838	7:33	7:47	7:07	26m	40m

Accordingly, five coaches out of 56 coaches observed at the Flynn Motor Coach Division arrived from nine minutes to 29 minutes prior to the last scheduled node on their assigned runs (8.9 percent of all observed pull-ins).[4] Similarly, six out of 75 coaches observed at the Kirkland Motor Coach Division arrived prior to the last scheduled node on their assigned runs (8.0 percent of all observed pull-ins). Although some of these early arrivals may be due to vehicle breakdowns or approved requests from operators to end their runs early, the practice of "cutting runs short" to leave work early is one which is reportedly common, based on interviews conducted during this study.

There are no yard supervisors or controllers assigned at the yards to observe the pull-in rotation during the evening peak service period, although a controller is present to maintain records of run assignments, accept overtime request slips from operators, and perform other miscellaneous duties. Without adequate supervision and reporting at the yards, we believe schedule adherence at the end of runs will continue to be poor.

Transit Service Inspector Perspectives on MUNI Services

We interviewed many Transit Service Inspectors. In general, the morale of those with whom we talked is very low, particularly among those who have been employees of MUNI for many years. The inspectors we interviewed discussed their feelings that many employees now take advantage of "quirks" in MUNI's rules to manipulate the system to their advantage. They believe some operators abuse Workers Compensation rules by making inappropriate or fraudulent claims; and avoid work, as evidenced by records of high numbers of miss-outs, claims that equipment is faulty as an excuse to return to the yard before the scheduled end of their runs, and operate coaches as "out-of-service" when required to be in-service. Some of the Transit Service Inspectors we interviewed stated that because of these perceived abuses, they are no longer enthused about their roles in the organization.

Transit Service Inspectors are also concerned about the lack of continuing training in MUNI, both on equipment and procedures. The Chief Transit Control Inspector acknowledges the need for continuing training, but cites the lack of resources to implement a training program. We did not evaluate training needs specifically for transit inspectors, but believe such training should be given a high priority by the Department.

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[4] Excludes three coaches which pulled-in very early, as follows: Run 495, 91 minutes; Run 513, 150 minutes; and, Run 518, 197 minutes. We have assumed these coaches had mechanical problems or prior approval by MUNI management to pull-in early on the observation days.

Transit Service Inspector Staffing Needs

Every MUNI manager, staff member and union representative with whom we discussed the quality of MUNI's current transit service expressed the opinion that an increase in the number of Transit Service Inspectors is necessary for improving MUNI services. We agree with the opinions of these individuals.

MUNI management, through the Public Transportation Commission, has requested the addition of twelve transit inspector positions in the Department's FY 1996-97 Budget. As currently planned, those positions would be used to staff additional "fixed posts" during the weekday daytime period.

However, we requested that the Chief Transit Control Inspector determine the number of inspections that would be required to perform services in an effective manner. His response to our request is contained in Appendix 1.4.2 of this report. His response also includes a reference to the "Clean & On-Time Program" of 1992, which he explains in our Appendix 1.4.3. In summary, the Chief Transit Control Inspector believes that the Transit Service Supervision Unit can do a "first-class job with 85 Inspectors," which would be an increase of 21 authorized positions over FY 1995-96 levels.

We generally agree with the opinion stated by the Chief Transit Control Inspector that the number of inspectors in the Department should be increased. However, we believe another key element to this staffing evaluation is the relationship between the reasonableness of current service schedules, and the need for transit line supervision.

As a result of many factors discussed throughout this report, MUNI cannot currently meet service demands required by its published schedules (e.g., available transit operators, maintenance performance, etc.). The Public Transportation Commission seems to recognize these problems, and, some members have publicly stated their desire to reduce scheduled service to that which can be reasonably supplied within current budget and operating constraints. These Commission members are essentially advocating a reallocation of resources from direct service activities, to supervisory and support activities which are essential if MUNI is to operate an efficient and effective service.

We agree that the City and County should not offer services it cannot provide on a reliable basis. It is critical that management's expectations for workers be set high, and that plans for adequate supervision and support be developed at the yards, at stations, and along routes as service levels are defined. Unless adequate supervision is supplied, services will continue to be characterized by late or missing transit vehicles, and public perceptions of MUNI will be poor.

Therefore, we cannot support the Chief Transit Inspector's assessment that an additional 21 positions are required at this time. Instead, we are in agreement with the Transportation Commission's decision to request that 12 new Transit Service Supervisor positions be added to the Department's FY 1996-97 Budget to supervise weekday services. The need for any additional Transit Service Supervisor positions should be evaluated only after management has taken action to improve MUNI's overall performance within the current organization.

It is our understanding that the Department plans to assign these additional 12 Transit Service Supervisor positions to fixed post locations within the City. As an alternative, the MUNI may wish to consider assigning these inspectors to randomly selected posts at locations where known service problems occur (including yards at pull-in). This suggested assignment system would increase the effectiveness of these additional inspectors. Introducing an element of uncertainty into the management control of the transit system on a regular basis also will enhance the efforts of transit operators to adhere to assigned schedules.

As a condition for granting the additional positions, MUNI should be required to establish a baseline standard for current transit service. This baseline standard should be developed by regularly performing service evaluations for schedule adherence on major lines, and by establishing current norms for morning and afternoon "not-outs," service complaints, pull-in schedule adherence, and other service variables that would provide a good indication of the quality of MUNI's services.

Conclusions

The number of budgeted fixed post and mobile transit supervisor positions has steadily decreased from a high of 95 in FY 1981-82 to 64 in FY 1995-96. Yet the need for street supervision to sustain schedule adherence is apparent.

During random corner checks performed by our study team, we found that only 62 percent of MUNI vehicles adhere to their published schedules, as compared with a service goal of 85 percent established by the Department. We also observed that the time between service could be doubled at specific stops if coaches ran late or early. We also found that approximately eight percent of motor coaches pull-in to the yards prior to their last scheduled passenger service stop.

By increasing the number of transit supervisors, adjusting transit schedules to conform with operator and equipment resources, and by regularly employing random line supervision techniques, MUNI can enhance transit services and schedule adherence.

Recommendations

The Mayor and the Board of Supervisors should:

1.4.1 Approve the Public Transportation Commission's request for an additional 12 Transit Service Supervisor positions for FY 1996-97 (these 12 positions are included in the Department's FY 1996-97 Budget).

The Public Transportation Commission should:

1.4.2 Direct the Director of Public Transportation to develop an efficient methodology for evaluating and reporting on the reliability of current transit services.

1.4.3 Direct the Department to develop and report on a deployment plan for the Transit Service Supervision Unit. This plan should maximize inspector effectiveness by rotating some inspectors to random locations based on periodic assessments of schedule adherence. Until the results of this deployment strategy are known, other supervisor positions (including the Transit Manager I positions included in the FY 1996-97 Recommended Budget), should not be authorized.

Costs and Benefits

The cost of adding 12 Transit Service Supervisor positions to provide increased field supervision would be $839,768 annually, at the top step including fringe benefits. However, the addition and effective deployment of these personnel would improve the quality and timeliness of current services.

1.5 MUNI Metro Tunnel Station Agents

- **Six of the nine MUNI metro tunnel stations have two fare gate entry booths. The MUNI Metro Station Operations Unit attempts to staff the secondary booths, depending on the station and booth location, for up to 15 hours per day during weekdays and 10.5 hours per day on weekends.**
- **Secondary booth coverage is most critical at the Powell, Civic Center, and Montgomery stations, due to high levels of use and the remoteness of the secondary booths from the primary booths. However, even those three secondary booths are often not staffed, resulting in public inconveniences, revenue loss, and equipment vandalism far in excess of the $45,667 in identified costs per year.**
- **By staffing the Metro Station Operations Unit at its authorized strength, by better controlling absences, and by investigating the costs and benefits associated with installing electronic surveillance equipment at all booth locations, adequate service and security would be better accomplished.**

The MUNI Metro Station Operations Unit, Central Control, and the Street Inspector Unit, the three organizations within the Field Operations Division of MUNI Operations, are responsible for MUNI's street transit operations. The MUNI Metro Station Operations Unit is responsible for staffing and operating the nine MUNI Metro tunnel stations. To accomplish its mission, the Unit is authorized the positions shown in 1.5.1 in MUNI's FY 1995-96 budget.

Table 1.5.1

Metro Station Operations Unit
Authorized Positions
San Francisco Municipal Railway - 1996

1	1941	Transit Manager II
4	9139	Transit Service Supervisor
57	9131	Station Agent
1	1426	Senior Clerk Typist

The number of authorized, full-time Station Agents has been reduced from a high of 65 in FY 1981-82, the year that the MUNI Metro System achieved current operational capability. Staffing declined to the current authorization of 57 during the next decade, to current levels.

In general, Station Agents control access to the MUNI Metro System, provide information to the public, and monitor patron activities. The entry gates are designed to be operated by inserting the basic fare in coinage, an approved token, or a magnetically encoded valid pass. The specific duties and responsibilities of Station Agents, as defined in the "Station Operations Manual," are shown below:

1. Monitors fare payment and performs fare collection equipment trouble-shooting:
2. Inspects and reports on station/facility maintenance conditions;
3. Monitors patron activities on platforms and mezzanines within the station with the aid of the Closed Circuit Television (CCTV) System;
4. Operates fare collection controls that permit entry through, and dispenses transfers from, the Attendant's gate;
5. Operates emergency vent fan controls as a backup to Central Control's remote operational system;
6. Uses the public address system to instruct and assist patrons, especially during emergency situations requiring patron movement or evacuation;
7. Controls the operation of handicapped elevators, service and emergency gates, and lavatories (with the BART agent in joint-use stations);
8. Monitors a booth console fire enunciator panel for fire alarms and the fire protection system alarms/trouble indication;
9. Calls for help and otherwise relays information to Central Control whenever necessary;
10. Answers questions from patrons and assists handicapped and other individuals with system, route and fare information.

Problems Encountered Due to Un-staffed Secondary Booths

Interviews with Station Agent management and a review of the Metro Station Operations staffing log reveal that the Powell, Civic Center, and Montgomery Metro Stations are the only stations consistently provided secondary booth coverage. Moreover, secondary booth staffing in those stations is provided considerably less than 100 percent of the scheduled time. The Metro Station Operations Manager believes that the cause of the irregular secondary booth coverage is an inadequate number of assigned Station Agents and excessive unscheduled absences.

According to the Metro Station Operations Manager, for most of calendar year 1995 the Station Operations Unit operated with only 48 Station Agents. However, as of the writing of this report, the Unit is assigned 53 Station Agents, three of whom were hired during the current fiscal year. In addition, two Station Agents are currently on workers' compensation absences and one is on a long-term disability absence. As previously stated, the Metro Station Operations Unit is authorized at total of 57 Station Agents.

The inability to consistently staff secondary station booths has had serious consequences, especially for the Powell, Montgomery, and Civic Center Stations. As previously stated, these stations are particularly vulnerable due to the physical separation of the primary and secondary entry booths. Some of the consequences of insufficient booth coverage are as follows:

- Patron inconveniences, such as the inability to use discount fares or transfers at non-serviced secondary booths;
- Inconveniences to the disabled;
- Revenue losses from fare evasion;
- Diminished safety and responses to emergencies;
- Fare-gate tampering and vandalism;
- Inefficiencies of requiring the attendant at the primary gate to handle fare gate malfunctions at the secondary booth; and,
- Transfer selling, coin receiver jamming, and unauthorized patron access through emergency gates.

Appendix 1.5.1 is an extract of recent incidents of vandalism, fare evasion attempts, and service problems recorded in MUNI's Unusual Occurrence Reports. As noted in the Appendix, these incidents regularly occur, are frequent, and can result in significant revenue loss and inconvenience to patrons.

For example, according to MUNI's records the cost of labor and materials to repair fare gates in calendar year 1995 was $26,600. That figure does not include approximately 23 coin canisters which were stolen and which cost $829 each, or an additional $19,067 for the 23 coin canisters. These costs also do not include revenue stolen from the coin canisters, which cannot be estimated. Additionally, the Department's Revenue Management cannot provide an estimate of revenue losses which occur due to the misuse of discount passes, fare gate intrusions, other canister thefts, and illegal entries. However, we believe that the total figure would be far in excess of the $45,667 in identified costs per year.

Staffing Required for All Primary and Three Secondary Station Booths

With minor exceptions, MUNI Metro Station primary booths are staffed from 4:00 A.M. to 1:00 A.M. during weekdays[1]. Also during weekdays, planned secondary booth coverage is from 8:00 A.M. to 9:00 P.M. for the Embarcadero, Montgomery Street, and Van Ness Stations, and from 6:00 A.M. to 9:00 P.M. for the Powell Street, Civic Center, and West Portal Stations (the latter is staffed until 9:30 P.M.). Planned primary booth coverage on Saturdays is from 5:45 A.M. to 1:00 A.M., except for the West Portal Station, which opens at 5:30 A.M. Planned primary booth coverage on Sundays is from 7:45 A.M. to 1:00 A.M., except that the West Portal Station opens at 7:30 A.M. Planned weekend staffing of the secondary booths is from 10:00 A.M. to 8:30 P.M. at the Powell Street, Civic Center, and West Portal Stations, only.

The table on the next page shows that in order to achieve planned primary and secondary booth coverage, including staffing for breaks, a total of 175 eight-hour shifts and 45 ten-hour shifts are required.

To determine the number of assigned Station Agents that the Metro Station Operations Unit would require to staff the 175 eight-hour and 45 ten-hour work shifts per week, and to provide coverage for scheduled absences, such as for vacations, and for unscheduled absences, such as sick leave with pay, we have performed the analysis shown in Appendix 1.5.2. That analysis shows that using the annual maximum sick pay sick leave of 13 days, and allowing for an average annual vacation of 120 hours (which we calculated from MUNI's payroll records) the total number of Station Agents required to staff the station booths is 57--composed of 42 eight-hour positions and 15 ten-hour positions. As previously stated, the Metro Station Operations Unit is currently authorized 57 full-time Station Agents, and has 53 assigned. The allocation of the 57 full-time Station Agent positions is also shown in the table below.

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[1] The Church Street, Castro Street, and Forest Hill Stations open at 4:30 A.M.

Table 1.5.2

Weekly Station Booth Staffing Requirements
San Francisco Municipal Railway - 1996

	Weekly Shifts		Staffing			
			8 Hour		10 Hour	
	8 Hour Shifts	10 Hour Shifts	Regular	Extra Board	Regular	Extra Board
Weekday						
Primary	75.00	30.00	15.00		7.50	
Secondary	45.00		9.00			
Breaks	20.00		4.00			
Subtotal	140.00	30.00	28.00		7.50	
Weekend						
Primary	27.00	9.00	5.40		2.25	
Secondary		6.00			1.50	
Breaks	8.00		1.60			
Subtotal	35.00	15.00	7.00		3.75	
Total	175.00	45.00	35.00	7.00	12.00*	3.00

*Rounded up from 11.25 positions.

On a weekly basis, a total of 35 Station Agents are required to fully staff the 175 eight-hour shifts (175 shifts divided by 5 shifts per Station Agent equals 35.0), which includes staffing for regular days off. That would leave a total of seven Station Agents who could be assigned to the eight-hour extra board to cover scheduled or unscheduled absences (an absentee coverage rate of 20 percent).

On a weekly basis, a total of 12 Station Agents would be required to fully staff the 45 ten-hour shifts (45 shifts divided by four shifts per Station Agent equals 11.25, rounded up to 12), which includes staffing for regular days off. Based on the current authorization of 57 positions, a total of three Station Agents could be assigned to the 12-hour extra board to cover scheduled or unscheduled absences (an absentee coverage rate of 33 percent). Combined, the unit would be provided an absentee coverage rate of 23.2 percent which is adequate to provide consistent coverage at the identified primary and secondary stations given current absentee patterns (equates to a 76.8 percent work rate).

Controlling Absences

In order to obtain an indication of how well absences are controlled within the MUNI Metro Station Operations Unit, we extracted time expenditure reports for the various categories of scheduled and unscheduled time charges for the Field Supervision Department for pay periods ending in July and October of 1995, and January and March of 1996. The results are shown in the table below.

As shown in the table, the "worked" category percentage for the Metro Station Operations Unit is less than that of the Street Supervision and Central Control Units by a margin in excess of four percentage points, which translates to approximately 2.3 staff persons. The category percentages of the Metro Station Operations Unit significantly exceeds those of the other two units in the categories of vacation, personal leave, and sick leave absences. The reasons for those and other higher absence percentages should be investigated and, where possible, controlled in order to increase the availability to approximately 80 percent.

Table 1.5.3

Summary of Time Worked and Absences Based on Sample Pay Periods for the MUNI Metro Station Operations Unit San Francisco Municipal Railway - 1996

	Station Agents	Street Supervisors	Central Control	Station Agents	Street Supervisors	Central Control
Worked Hours	13,979	16,692	7,558	73.01%	77.19%	78.47%
Scheduled Absences	2,878	3,095	1,232	15.03%	14.31%	12.79%
Unscheduled Absences	2,289	1,837	842	11.95%	8.50%	8.74%
Total	19,146	21,624	9,632	100.00%	100.00%	100.00%

Given that a certain number of long-term absences will probably continue to exist within the Metro Station Operations Unit, the Unit would have to be staffed at its authorized position count of 57, and obtain the approval of the Controller's Office to back-fill against long-term, non-pay absences in order to improve its secondary booth coverage. Mr. John Madden, Chief Assistant Controller, has stated that the Controller's Office normally approves such back-fill requests against non-paying, long-term absences.

Electronic Surveillance of Booth Areas

It has been suggested that the installation of electronic surveillance equipment in the Metro Station booths could help to alleviate fare avoidance and fare gate tampering problems previously described in this report. We did not conduct a thorough analysis of this suggestion.

However, we observed that given the current scope of station agent responsibilities, station agents would often be unable to monitor activity around the secondary booths using such equipment since they are frequently required to leave the booth to repair malfunctioning fare gates, assist patrons, and perform other duties. Further, the Budget Analyst has also been advised that there are meet-and-confer issues that would need to be addressed concerning the installation of electronic surveillance equipment in the booth areas.

Although the presence of surveillance equipment could serve as a deterrent to fare evasion, and fare gate tampering, its utility is questionable at this time given its cost to install and maintain. The Budget Analyst has been advised by the Municipal Railway Transit Police that the cost of procuring electronic monitoring equipment for all of the primary and secondary booth locations would be approximately $14,165 and that the cost of installing the equipment, which would be performed in-house by the Department, would be approximately $67,000, for a total cost of approximately $81,165. Annual maintenance and replacement costs cannot be determined at this time based on available information, but could be significant.

Therefore, we are not recommending the installation of such equipment at this time. Instead, we recommend that the Department study the costs and benefits of installing electronic monitoring equipment at all of the Metro Station booths after the effects from fully staffing the recommended station booth locations is known. Once the impact of recommendations to fully staff the station booths is known, MUNI should present its assessment of the costs and benefits of implementing an electronic surveillance system to the Public Transportation Commission.

Work Environment of Station Booths

During the course of this audit, we received numerous complaints and suggestions from station agents concerning the Metro Station and booth working environments. Some of the concerns, such as the presence of rodents in booths, air conditioning malfunctions, and decaying floors, are strictly of a working condition nature. Others, such as the need for an updated procedures manual, improved signage in stations, and change-machine malfunctions in non-BART stations, are of an operational nature.

One universal complaint concerns the location of the station monitors within the primary booths. The monitors are located behind the Station Agent, who must, in order to view the monitor, turn away from viewing the front of the booth and the fare gate area. According to the station agents we interviewed, during periods of heavy usage, viewing the station monitor is not feasible.

The Department management should conduct a study of the Metro Stations to (1) determine steps that can be implemented immediately to improve operational and working conditions, and (2) to determine changes that would require significant funding as part of a capital project. The study should include all facets of the station environment, including:

Location of Monitors
Lighting in Metro Tunnels
Air Conditioning Systems
Change Machines
Public Address System
Security of Booth Doors
Removal of Rodents
Update of Station Agent Manual
Bathroom Remodeling
Control of Water Flows in Church Station
Replacement of chairs
Metro Station Signage

Management of the MUNI Metro Station Operations Unit

As shown in Table 1.5.1 of this report, the MUNI Metro Station Operations Unit is managed by a classification 1941, Transit Manager II. Management of the Unit also includes four transit service supervisors.

During this study, we observed that the Transit Division Superintendents, who also are responsible for management of hundreds of transit operators, are classified as Transit Manager II. The complexity of the job and the scope of responsibility for a Transit Division Superintendent far exceeds that of managing the MUNI Metro Station Operations Unit. Further, the Station Operations Unit is authorized four Transit Service Supervisors who perform the preponderance of the work of ensuring that the Unit performs adequately.

Currently, the Kirkland, Green (LRV), Cable Car, and Flynn Transit Divisions are supervised by managers classified as Transit Manager I instead of the authorized position of Transit Manager II. Our observation is that staffing the MUNI Metro Station Operation with a Transit Manager II, while staffing Transit Divisions with managers designated Transit Manager I--unless supported by a significant mitigating circumstance--is a mis-allocation of personnel resources. The manager of the MUNI Metro Station Operation prior to the incumbent manager was classified as a Transit Manager I.

We recommend that the Department of Human Resources survey the management position in the MUNI Metro Station Operation Unit and classify the position accordingly.

Conclusions

Six of the nine MUNI metro tunnel stations have two fare gate entry booths. The MUNI Metro Station Operations Unit attempts to staff the secondary booths, depending on the station and booth location, for up to 15 hours per day during weekdays and 10.5 hours on weekends.

Secondary booth coverage is most critical at the Powell, Civic Center, and Montgomery stations, due to high levels of use and the remoteness of the secondary booths from the primary booths. However, even those three secondary booths are often not staffed, resulting in public inconveniences, revenue loss, and equipment vandalism far in excess of the $45,667 in identified costs per year.

By staffing the Metro Station Operations Unit at its authorized strength, by better controlling absences, and by investigating the costs and benefits associated with installing electronic surveillance equipment at all booth locations, adequate service and security would be better accomplished.

Recommendations

The Director of Public Transportation should:

1.5.1 Direct MUNI Metro Station Operations management to develop a plan for reducing absenteeism, and to closely monitor and manage staff absences in order to achieve at least 80 percent of paid time on the job.

1.5.2 .Staff the MUNI Metro Station Operations Unit at its authorized strength of 57 full-time positions, using existing resources authorized for the Department.

1.5.3 After regular full staffing has been achieved, investigate and report back to the Transportation Commission on the costs and benefits of installing electronic monitoring equipment at all of the station booths, taking into consideration the full benefits from more consistent staffing of the primary and secondary booths.

1.5.4 Request that the Department of Human Resources survey and classify the top management position in the MUNI Metro Station Operations Unit to determine whether it would be more appropriately staffed at the Transit Manager I level.

1.5.5 Conduct a study of the Metro Stations and report to the Transportation Commission on steps that can be taken at minor cost to improve operational and working conditions, and on those working and operational condition improvements that may require significant funding through a capital project.

Costs and Benefits

There would be no additional costs to implement these recommendations.

By staffing the Metro Station Operations Unit at its authorized strength, by better controlling absences, and by investigating the costs and benefits associated with installing electronic surveillance equipment at all booth locations, adequate service and security would be better accomplished.

1.6 Maintenance Management Controls

- **Many Management controls and processes in MUNI's maintenance division are weak and need improvement. For example:**
  - √ **Persons have been observed asleep during the graveyard shift at the cable car barn, which at the same time was observed to be left unsecured and unattended by employees.**
  - √ **Quality control and monitoring of road calls associated with disabled revenue vehicles is weak.**
  - √ **Employee evaluations are consistently not performed so supervisors lose control of effective and consistent management oversight of their assigned employees.**
  - √ **The Maintenance Division has yet to develop a set of operating standards in order to create a measure of effective labor utilization.**
- **Increased management controls and oversight are needed to improve maintenance supervision and productivity, and security of assets.**

During the course of this management audit, we visited each of MUNI's maintenance facilities during all shifts; interviewed managers and maintenance workers; and reviewed existing directives and procedures, internal memos, and consultant reports. As a result of these activities, we found several areas of operations with weak management controls in need of improvement.

Swing and Graveyard Shift

MUNI is a 24-hour, seven day per week operation. During late evening and early morning hours, there are maintenance workers assigned to all of the facilities to respond to road calls and perform maintenance on vehicles in preparation for the following AM peak service period. During the "graveyard shift", which can begin any time between 11:00 PM and 3:00 AM, each facility is assigned a supervisor. However, interviews with supervisors and workers assigned to the graveyard shift indicate that management rarely visits the yards during these hours.

Maintenance Controller Workload

We visited the swing and graveyard shifts at each of MUNI's maintenance facilities during evening and early morning hours to conduct interviews and observe operations, evaluate the type of maintenance work that is generally scheduled, and determine the work activities that are accomplished. During these visits, we made the following observations:

- At all facilities, assigned employees are often difficult to locate. After several rounds through the Flynn Articulated Motor Coach Yard during the hours between 7:00 P.M. and 10:00 P.M., we did not observe any mechanics working on coaches parked in the maintenance bays.

- At the Woods facility, maintenance employees had only a minimum amount of work underway at the time of our arrival at 3:30 A.M., over one half hour into their shift. When our presence became known, these workers dispersed to areas of the yard where they could not be observed. We could not determine whether these individuals were working when we left the facility because none were observed working on coaches in the maintenance bays.

- Two maintenance controllers were on duty at the Woods Yard during our visit, and we observed the work they perform. That work included coordinating road calls, entering vehicle repair data into the computerized Vehicle Maintenance System (VMS) and working with the swing and graveyard superintendents to assign repair and service activities to workers. We later analyzed the work product of the controllers assigned to this shift, including the monthly data reports on the hourly distribution of road call activities. Based on our observations and this review of workload, we believe that the controller function at the Woods Yard can be accomplished by one rather that two controllers between the hours of 11:00 P.M. and 6:00 A.M.

This reduction in staffing would reduce the total number of maintenance controllers from eight to seven positions, and would require that an additional time slot on day- and swing-shift periods be covered by a single controller at either Woods or Flynn Center. The deletion of one 7340 Maintenance Controller, or 7382 Auto Mechanic Assistant Supervisor, would save approximately $73,500 annually.

Cable Car Barn Security

During an unannounced visit to the Cable Car Barn at 3:30 A.M., we observed that the Mason and Washington Street garage doors were left open and unguarded.[1] We entered the facility and walked through each area unapproached by MUNI employees. There were no employees in attendance at the control room on the first floor; and, there were no employees present on the second floor where 39 Cable Cars are stored. Although approximately one-half hour was spent inspecting individual Cable Cars, no MUNI maintenance personnel made their presence known.

While inspecting the Cable Cars, we observed that several private vehicles were parked in unauthorized parking areas and one of these vehicles contained a presumed employee sleeping.[2] After completing a separate visit to the Operations Division on the second floor mezzanine and completing appropriate verification of our visit, we exited through the open barn door at Washington Street, unnoticed.

We believe that this represents a serious breach of security at a City facility and particularly at one that houses a local and national treasure such as the San Francisco Cable Car. Five maintenance employees are assigned to work on the graveyard shift at the Cable Car Barn, so there should be sufficient staff to monitor the security of such valuable assets. If maintenance employees are called away for an emergency, the barn door should be locked and the facilities made secure.

This observation was made known to MUNI management by letter during the course of this study. The Department contacted our staff to initiate an investigation of the observation that an individual was sleeping in a private vehicle, and indicated to us that further action would be taken to improve security at the Cable Car Barn. At the time of this report, we had not been advised of the specific corrective action which had been taken by management.

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[1] We had been previously advised that several months ago a battery charger had been stolen from a MUNI service vehicle in the Cable Car Barn.

[2] During interviews with Maintenance Division staff, we were advised that graveyard shift employees at the Cable Car Barn often sleep during the period after the system is shut down and before the system is re-started in the morning. The Department indicates that the individual found sleeping during our observation was an off-duty platform operator who was napping prior to his drive home. We confirmed that the vehicle belonged to a Cable Car operator who resides in Sacramento.

Need for Management Controls on the Graveyard Shift

These examples, in addition to identifying the need to make specific improvements at these facilities, point to a broader need for MUNI Maintenance Division upper management to establish management controls on this shift. Because graveyard shifts can become difficult to manage, due to their isolation from day shift activities, it is particularly important that management establish systems for obtaining reports and monitoring graveyard shift employee activities. Controls should include the assignment of trusted supervisory personnel, and monitoring with frequent, random visits to each of the yards that has significant maintenance activity.

Road Calls

Road calls occur when bus operators advise Central Control of bus breakdowns or malfunctions. Central Control will advise the appropriate maintenance facility controller to provide a road call service. Diesel bus road call service can be accomplished by dispatching a service truck or by bus replacement, called "cut out". Disabled electric trolley coaches are assisted by service trucks only. We participated in several road calls to rescue stranded diesel buses during the course of examination of this process. We observed the following:

- Neither Operators nor Central Control advise the maintenance controller whether a disabled bus is facing inbound or outbound. During our observations, the driver of the replacement bus invariably approached the disabled bus from the wrong direction. On one occasion, a diesel bus was found facing outbound on Market Street at Montgomery Street during the afternoon commute period. Because the replacement bus approached the scene from an inbound direction, an additional ten to fifteen minutes of driving time was required to maneuver the replacement vehicle in the same direction as the disabled bus.

- Because the road call operation for diesel buses is administered from the Woods facility only, disabled articulated diesel buses which can continue under their own power are returning to Flynn Center without the exchange of a replacement bus. Since there is no maintenance monitoring system for the return of these buses, a bus operator may take such an opportunity to report a questionable bus disability, return their bus unnoticed and sit out the remainder of their scheduled run.

  MUNI is installing electronic hub odometers to its entire fleet in order to collect and monitor mileage and servicing data at the time vehicles are serviced. MUNI reports that the cost of the components plus system installation and spares for the entire 500 unit diesel fleet would cost approximately $540,000 ($1,080 per vehicle). We believe that the current proposed system should be expanded to also collect information on operator identification and the time bus completes its run This could be done by installing additional signaling devices at the various yard entrances where the fare boxes are probed. According to the vendor manufacturer, there would cost an estimated $216 per vehicle, for a total $108,000 cost of equipment and installation for the 500 coach diesel fleet.

- One road call was initially described as a "damaged tire" on a diesel bus disabled at 41st Street and Sloat Boulevard in the Sunset District. The auto service worker who provided the replacement bus could not find any impairment to the tire and returned the disabled bus to the Woods maintenance yard at up to speeds of 60 miles per hour on Interstate 280.

Road call data entry into the VMS is a time consuming and tedious process for the maintenance controllers. These data entry duties limit the time and effort available to these controllers to investigate and report on the basic problem that precipitated the road call; and to determine how these problems may relate to other reported break-down patterns, such as those related to either component failures or the lack of effective preventive maintenance. Because a quality control program had been deleted several years ago due to staff reductions, several maintenance personnel have advised us that some operators feel at ease reporting bogus problems without discovery, and the potential retribution that may be determined appropriate from an effective quality control program.

Such a program should be reinstated and implemented by maintenance managers based on a more careful review of available road call data. This recommendation should be implemented in conjunction with recommendations in this and in Section 1.1 of this report, that managers become more aware of activities occurring in the field and acting to correct incidence of improper conduct.

During the last six months, there have been an average of 1,800 road calls per month. A conservative estimate of a 10 percent reduction of such calls due to the implementation of an effective quality assurance program would reduce the calls by 180. This would be equivalent to a three day period when no auto service workers would be assigned to other tasks related to preventive maintenance activities.

Increasing Operator Responsibility

The current procedure of assigning buses to drivers rules out any possibility of implementing a *one coach-one driver* policy, or even a modified program that would maximize specific bus assignments to individual drivers. Such a policy would improve equipment respect and accountability and would build relationships between operators and mechanics over directing the maintenance and care of individual vehicles. For example, operators would become familiar with the individual driving characteristics of a particular bus and would tend to appreciate a pride of ownership, which does not occur under the current policy that provides a different bus each day. Further, maintenance personnel would be able to track the driver habits which may cause individual buses to demonstrate unusual wear and tear on such parts as accelerators and brakes. The policy would provide an incentive for operators to drive more carefully and practice prudent driving skills.

Although the permanent assignment of specific coaches to individual drivers is prevented by current rules affecting seniority rights, and the different types of equipment[3] required on routes, some progress could be made by assigning individual operators to the same bus or coach under the following conditions:

- Specific vehicles would be assigned to the same routes and runs;
- Operators would bid for routes and runs by seniority;
- Operators would be given the same vehicle assignment for the duration of the sign up;
- Operators bidding the same job assignment on each sign-up, would get the same vehicle every time. On the other hand, someone bidding new assignments every sign-up, could receive a different vehicle for each sign-up period; and,
- Overtime and extra board work assignments, floaters, and vehicle exchanges due to maintenance needs or temporary alterations in route and run equipment requirements, would effect this plan.

Employee Evaluations

MUNI managers have not implemented a program to ensure that annual evaluations of employees are accomplished at required intervals. Managers and supervisors interviewed during this study advised us that annual evaluations are a waste of time and are performed only when a directive is received from a higher tier of management. Under those circumstances, annual evaluations have been hit-and -miss at best.

However, such evaluations are important because, in their absence, individual employees are likely to receive more critical or negative comments and corrections on their work from supervisory personnel. Further, evaluations permit employees to assess their own progress in improving job skills and identifying what additional training may be needed. Setting aside specific time enables supervisors to more objectively evaluate and discuss, with their employees, both strong and weak attributes and to identify specific areas for improvement.

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[3] Assignment of a 60 foot articulated bus to the 3rd Street route has to do with passenger load, route and run requirements and is different from the assignment of a 30 foot bus to the Coit Tower route which needs a reduced turning radius ability.

Operating Standards and Work Productivity

The MUNI Maintenance Division has not established written operating standards, although in 1991 better labor utilization was made an objective in conjunction with plans to develop the Islais Creek project.[4] At that time, existing maintenance practices were to be examined and those areas of low productivity identified. Once identified, potential improvements could be investigated and the most cost effective solution could be made to contract-out that function. In conjunction with that goal, a set of operating standards would also be established to create a measure for effective labor utilization. Although plans for the development of the Islais Creek project have been delayed, the related objective of developing operating standards should move forward independently.

Without established measures for effective labor utilization, MUNI does not track or analyze its maintenance employee productivity (e.g. hours per job type) in a comprehensive manner.

Conclusions

Many Management controls and processes in MUNI's maintenance division are weak and need improvement. For example:

- Persons have been observed asleep during the graveyard shift at the cable car barn, which at the same time was observed to be left unsecured and unattended.

- Quality control and monitoring of road calls associated with disabled revenue vehicles is weak.

- Employee evaluations are consistently not performed so supervisors lose control of effective and consistent management oversight of their assigned employees.

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[4] A research paper entitled *The San Francisco Municipal Railway Central Maintenance Facility Program Plan*, by Philip Adams of MUNI and Sheila Barr of Boos-Allen & Hamilton Inc., Consultants.

- The Maintenance Division has yet to develop a set of operating standards in order to create a measure of effective labor utilization.

Increased management controls and oversight are needed to improve maintenance supervision and productivity.

Recommendations

The Director of Public Transportation should:

1.6.1 Implement management standards throughout the organization that (1) guarantee adherence to basic employee expectations for job conduct and performance, and, (2) establish a procedure that makes managers accountable for the implementation of these standards and quality assurance measures. Sleeping on the job and the protection of city assets are two major problems that should be immediately addressed;

1.6.2 Reduce the number of graveyard maintenance controllers from two to one at the Woods Facility to reflect the actual level of work required during this shift;

1.6.3 Instruct Field Operations Central Control to advise maintenance dispatchers on the direction as well as the location of disabled vehicles in order to minimize the time needed for the scheduled run to be out of service;

1.6.4 Implement a *one coach-one driver* policy that would improve respect for equipment and worker accountability, and would foster relationships between operators and mechanics regarding the maintenance and care for individual vehicles;

1.6.5 Require annual performance appraisals by requiring accountability of each division for the timely performance of all employee evaluations. MUNI Personnel Unit should also be accountable to provide a more concerted effort to assure that all evaluations are completed on time.

The Deputy Director of Maintenance should:

1.6.6 Direct supervisors and controllers to implement quality control procedures and practices that will reduce questionable road call incidents by an estimated ten percent;

1.6.7 Expand the installation of electronic hub odometers to the front wheel of the 500 diesel buses in the current fleet in order to clock the accurate time that revenue vehicles complete their schedule runs;

1.6.8 Develop and adopt time goals or operating standards for as many maintenance activities as practical. The development of guidelines should be undertaken jointly by management and labor personnel in accordance with existing labor Memoranda of Understanding. The time estimates should be used as guidelines, not as strict standards. Their purpose should be to track mechanic productivity and to identify exceptions or deviations from expected output. Major deviations should be investigated and acted upon accordingly when not justified.

Costs and Benefits

Implementation of improved management controls would enhance maintenance supervision and productivity. Because the City Cable Car fleet is a major City asset as well as a national landmark, their protection and safety should be one of MUNI's highest priorities.

Quality assurance provisions for road calls that dispatch assistance to disabled vehicles during scheduled runs should be implemented to reduce the number of unnecessary requests for road assistance. We estimated that road calls could be reduced by 10 percent which would allow Auto Service Workers to be reassigned to other maintenance duties. The deletion of one maintenance controller from the graveyard shift would save an estimated $73,500 annually. In addition, MUNI should expand the scope of installing electronic hub odometers to its 500 diesel bus fleet which could be paid from the savings in labor costs of a maintenance controller. These devises would keep track of the time vehicles return after completing a designated run, which further make operators accountable for their time.

Annual staff evaluations permit managers and employees to assess areas for improvement and to identify areas in which additional training is needed. The development of work standards would allow MUNI to objectively evaluate the productivity of its maintenance workers. In turn, the maintenance workers would know what is considered an acceptable and fair level of performance.

1.7 Maintenance Engineering

- **Engineering staff assigned to the maintenance division has been depleted from earlier levels due to budget reductions.**
- **This reduction in engineering staff has resulted in a number of technical shortcomings, including: (1) no in-house analysis of alternate products and services including the re-engineering of parts, (2) minimal expertise to develop alternative repair solutions that would correct repeated breakdowns to the revenue fleet, (3) the lack of maintenance standards that would provide managers with staff performance indicators, and (4) weak in-house engineering support for facility design and renovation.**
- **To overcome these shortcomings, the Public Transportation Department needs to dedicate three engineers to the Maintenance Division, one to each of the primary vehicle modes: LRV, Diesel, and Trolley divisions. These engineers would provide technical assistance and support for major vehicle overhauls, the review of specifications and evaluation of bids from outside vendors, analysis of alternate products and services, the development of solutions to design deficiencies, the preparation of work standards and practices, and coordination with existing Capital Projects engineers on the design and renovation of facilities.**
- **Cost savings from implementing these recommendations would be at least $450,000 per year. After deducting MUNI's cost for additional staff of $226,700 per year, the net annual savings would be $223,300.**

At the present time, the Maintenance Division does not have dedicated engineering staff. This is a significant change from seven years ago when the Maintenance Division had six budgeted engineers dedicated to vehicle engineering (three electrical engineers and two mechanical engineers) and an administrative engineer).

At that time, engineering skills dedicated to maintenance activities would provide needed support in areas such as:

- Reducing the cost of existing parts by analyzing alternative products and services;
- Improving vehicle performance and the component life of vehicle parts; and,
- Preparing work standards to ensure appropriate maintenance work practices.

Reducing the Cost of Parts

At the present time, one engineer has been transferred from the Capital Programs Division to work with all Electrical Maintenance Section units (LRV, Electric Trolley and Historic PCC). This engineer is developing alternative designs for parts that have experienced reoccurring failures. Based on data maintained by this engineer, such redesign has led to the purchase of less costly parts. Annual savings of $300,000 for parts which were redesigned and ordered during the three year period, January 1992 through December 1994, is shown below:

Table 1.7.1

Estimated Cost Savings Related to the Re-Engineering of Parts January 1992 through December 1994

Part Description	Old Price	New Price	Difference	Annual Usage	Annual Savings
Brake Pads	$36.00	$25.00	$11.00	3,104	$34,144
Pressure Trans	610.00	217.00	393.00	32	12,576
Gear Box Wiper	475.00	54.00	421.00	184	77,464
Buffer Pads	423.00	40.00	383.00	168	64,344
Gear and Pinion	1,768.00	996.00	772.00	35	27,020
Actuator Body	1,036.00	971.00	65.00	40	2,600
Brake Disc	1,265.00	850.00	415.00	109	45,235
Ram Actuator	169.00	65.00	104.00	63	6,552
Driven Flange	250.00	25.00	225.00	113	25,425
Totals	$6,032.00	$3,243.00	$2,789.00	3,848	$295,360

Improved Vehicle Performance and Component Life

Examples of the existing staff's on-going and completed engineering work on the existing Light Rail Vehicle (LRV) and electric trolley coach fleet show that the life of component parts have been increased, solutions to recurring failures and unsolved problems have been resolved by redesigning components and component systems, and the cost of replacement parts have been reduced through in-house construction and rebuilding of existing parts. Based on examples identified below, it can be conservatively estimated that an additional $150,000 annually could be saved with the re-engineering of parts and vehicle components. The following improvements have already occurred:

- Blower motors for traction motors - failures were reduced from five to seven motor burns per week to one motor burn every two months.
- NiCd Batteries - identified cause of weak LRV batteries. Recommended corrective procedures which saved the cost of replacing batteries for 120 LRVs at $3,000 each for a total savings of $360,000.
- Filter system was designed for trolley coach traction motors to increase service life. Improvements increased motor life by approximately 40 percent or about 30 motors. Each motor overhaul is estimated to cost $8,000 for a total estimated savings of $240,000.
- Welding procedure for hub repair was designed. Savings is approximately $2,000 per hub. There are currently eight hubs needing repairs.
- Linear Control Valve - saved the repairs of new linear control valves by identifying the cause of valve failure.
- Blowdown system for trolley coach traction motors was designed to increase service life.
- Brake actuators design defect was corrected by redesigning the O-ring seals. This will increase reliability of the brake actuators and reduce fluid losses.

The reduction to the cost of existing parts and the improvement of vehicle performance and component life together will save an estimated $450,000 annually. Based on our review of the benefits derived from engineering contributions to parts redesign and repair, we conservatively estimate that these savings could be increased by an additional $150,000 per year.

Developing Guideline Procedures and Standards

Engineers can also develop guideline procedures that will help solve recurring problems that affect service. For example, a "trouble shooting" procedure has been recently completed that addresses the "quick shut-down" or lost propulsion problem when the LRV operator moves the throttle (P-handle) from maximum power to full service brake and back to maximum power. This causes a momentary shut-down of the LRV. A careful examination of related component parts by the engineering staff has produced a step-by-step guideline that will correct this recurring problem.

Other reviews involving failing equipment find design flaws that when corrected will solve the problem and avoid costly replacement of parts. For example, repeated failures of the air blowers in the LRVs have caused considerable discomfort for patrons riding the Metro system. An inspection of the LRV air comfort blower motor revealed that the connecting brush holders were improperly positioned so other connecting parts failed prematurely, causing a shut-down of the air comfort blower. It was discovered through testing of the component equipment that there was a design flaw in the brush holder by the motor manufacturer. As a solution the machine shop will modify the errant part as a temporary fix to the problem while the motor shop will schedule a more permanent solution with a complete overhaul and redesign of the affected parts.

The assignment of engineers directly supporting maintenance activities would provide technical assistance for determining major repair programs that are necessary to maximize the number of available revenue vehicles. Currently, there are several campaigns underway to extend the life of the existing fleet and to repair other vehicles that have recently shown unexpected structural problems or have particular parts that have failed due to the unique topography of the City or for other unexpected reasons. The engineers should be working closely with the mechanics who perform the repairs and maintenance, the maintenance controllers who plan and schedule the daily maintenance assignments, and the maintenance trainers who develop their instructional lesson plans. This would permit a greater awareness of day to day problems occurring with the maintenance of the vehicles and immediately bring such matters to the attention of the controllers and engineers to develop solutions and the trainers to devise appropriate on-the-job lesson plans that would in turn advise mechanics of the improved standards devised by the engineers.

New Equipment and Facility Design

Greater engineering awareness in the Maintenance Division will also help managers to identify cost effective solutions to the design and construction issues which surface during the planning for new equipment and improvements to existing facilities. For example, the new Breda LRVs have been built too wide to fit into two of the storage and repair buildings at the MUNI Metro Rail Center. These entrance portals will need to be reconstructed to accommodate the entrance and exit of these vehicles. In addition, the Breda cars are longer than the current Boeing vehicles so only three rather than four of the new Breda cars can be coupled at West Portal and Embarcadero Stations for their underground runs in the Metro tunnel. The coupling of fewer vehicles is necessary so that the entire train configuration will fit at each underground station without a portion of the train overlapping into the tunnel at the Forest Hill Station. While there are legitimate service goals that led to the acceptance of these design features, had maintenance engineers been more involved in the planning phase, alternative solutions may have been identified.

In addition, several different paint varieties, including metallic gray, have been selected for the new Breda coaches. If the Maintenance Department paint unit had been consulted about the metallic gray paint, they would have advised that this particular paint is difficult to match, expensive to buy, and time consuming to apply, particularly at the lower area of the vehicles where the metallic gray paint portion has been designed.

As brought to our attention by management staff, prior construction problems have also surfaced at the Potrero Division Trolley Coach Division and at the Flynn Center Diesel Division. These included several basic design flaws associated with the installation of improvements to accommodate the arrival of new 60 foot Articulated Electric Trolley Coaches and the parts storeroom at the Flynn Center, including:

- Excavation of two 60 foot pits under interior garage track No. 21 which would permit mechanics to service the undercarriages of the articulated coaches. After the pits were excavated, capital projects engineers discovered that the pits were too close to the wall. A change order estimated to cost $10,000 was needed to correct this error.

- A three post lift was designed and constructed along interior garage track No. 20 to raise the new 60 foot electric articulated coaches. Again the construction was too close to a bearing wall and to an electric circuit conjunction box for the lift to be operational. Although the work is completed, the lift has never been used.

- Cyclone cleaners to wash and vacuum the electric articulated coaches were designed prior to full knowledge of the coach specifications of housings at the roof of the vehicle. Subsequently vacuuming attachments to the cyclone cleaners have damaged several components on the top of the coaches prior to the implementation of a change order which removed the vacuum housing so as to prevent further damage to the trolley coaches.
- An automated switch control in the tower control room needed to be re-installed so that it was properly oriented to the actual configuration of the trolley coach parking area.
- Although the parts storeroom at Flynn Center has 35 foot high ceilings, only the lower portion is used with six foot high storage bins. During the time that this facility was rehabilitated for transportation use, it has been reported that the Capital Projects engineers did consider a plan to maximize the use of space for parts storage in consultation with the Maintenance Division. However, MUNI could not document the related costs and substantiate the decision not to provide the added space for needed parts storage.

It is reasonable to expect that such errors noted above could have been avoided if the plans developed by the Capital Projects Division included greater consultation with maintenance and parts storeroom personnel. Engineers dedicated to the needs of the Maintenance Division would help avoid such problems in the future.

Engineering Staff Requirement

As part of its maintenance stabilization strategy, the Transportation Department has currently recommended three new positions[1] (Maintenance Engineer Manager, Senior Mechanical Engineer, and Electrical Engineer) for a dedicated program of engineering support "designed to remove existing deficiencies and bring significant improvement in the mechanical and electrical fields." These three new positions would cost an estimated $246,900 annually.

We are in general agreement with the department's investment strategy to dedicate engineering positions to its maintenance operations. However, instead of the Department's recommended staffing configuration, we recommend three new engineering positions that would cost $226,700 annually and would better fulfill the engineering activities identified in this finding, as follows:

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[1] As proposed in 1996-97 MUNI Maintenance Division Budget, revised April 15, 1996. Two other positions, a Warranty Fleet Manager and a Warranty Quality Assurance Inspector are discussed in a separate finding in this report.

Table 1.7.2

Budget Analyst Recommended Positions for Maintenance Division Engineering Staff

Class	Title	Bi-Weekly Rate	Count	Annual Cost
5240	Electrical Engineer	2,209-2,685	2	114,868
5258	Senior Mechanical Engineer	2,557-3,108	1	$66,482
	Subtotal		2	181,350
	Fringe Benefits (@ .25)			45,350
	Total		3	$226,700

We identified earlier that additional engineering support would provide approximately $450,000 in annual savings from reduced costs of existing parts and improved vehicle performance. The additional annual personnel cost of $226,700 would provide a net annual savings of $223,300.

Further, the engineers should work directly under the supervision of the modal general superintendent and on site at the Woods, Potrero and Metro Facilities. The engineers would direct a Technical Services Unit which would have the participation of unit supervisors, senior controllers, materials management supervisors and maintenance trainers. The Technical Services Unit would focus and direct all available on-site maintenance planning and programming resources toward immediate problem solving campaigns as they arise. In the past, technical services have been directed on a limited basis at Woods with a review of repairs procedures for wheel chair lifts.

Conclusions

Vehicle engineering staff assigned to the maintenance division has been depleted from earlier levels due to budget reductions.

This reduction in engineering staff has resulted in a number of technical shortcomings, including: (1) no in-house analysis of alternate products and services including the re-engineering of parts, (2) minimal expertise to develop alternative repair solutions that would correct repeated breakdowns to the revenue fleet, and (3) lack of maintenance standards that would provide managers with staff performance indicators.

To overcome these shortcomings, the Public Transportation Department needs to dedicate three engineers to the Maintenance Division, one to each of the primary vehicle modes: LRV, Diesel, and Trolley divisions. These engineers would provide technical assistance and support for major vehicle overhauls, the review of specifications and evaluation of bids from outside vendors, analysis of alternate products and services, the development of solutions to design deficiencies, and the preparation of work standards and practices.

Cost savings from implementing these recommendations would be at least $450,000 per year. After factoring-in the cost for additional staff of $226,700 per year, the net annual savings would be $223,300.

Recommendations

The Director of Public Transportation should:

1.7.1 Modify the Department's budget request and assign three engineering positions, (one new senior mechanical engineer and two new electrical engineers) to the primary vehicle modes: LRV, Diesel and Electric Trolley Coach Divisions. These engineers would also consult with existing engineers assigned to the Capital Projects Division on facility design and renovation.

1.7.2 Assign the engineers to supervise the work of the Technical Services Units, in consultation with unit supervisors, senior controllers, materials managers and maintenance trainers, to solve immediate problems, develop alternative repair and maintenance solutions, and provide quality assurance to maintenance procedures and standards.

Costs and Benefits

The additional three engineers would cost $226,700 annually. This cost would be offset by an estimated $450,000 through savings in design enhancements, improved parts from in-house fabrication, the preparation of more detailed specifications to vendors, and the preparation of work standards to improve work practices. This would result in a net annual savings of $223,300 during the first year of implementation.

2. Increased Cost Effectiveness

Proposition J specifies that the Budget Analyst identify methods for MUNI to increase its cost effectiveness. Findings in this area are directed toward what we consider to be questionable practices related to the use of budgeted resources. Implementation of recommendations included in the findings in this section of the report would result in some improvements in MUNI services. However, we believe that the primary benefit to be derived from implementing these recommendations would be to improve cost effectiveness by reducing wastefulness, and safeguarding money and assets within the Public Transportation Department.

This five findings included in this section of the report includes discuss the following general topics.

- Inappropriate Use of Staff Resources: For many years, the Municipal Railway has assigned transit operators, mechanics, and other maintenance personnel to duties other than those for which they were hired. Sections 2.1 and 2.2 review how this practice has become excessive, costly, in violation of current agreements with employee groups, and is inconsistent with budget policy established by the Mayor and the Board of Supervisors.

- Fuel Waste, Engine Wear, and Air Pollution: Section 2.3 examines the MUNI Maintenance Division's current practice of starting diesel motor coaches three hours prior to the A.M. pull-out, resulting is wasted fuel and engine wear which costs the City $670,000 per year and significantly contributes to air pollution in the Bay Area region.

- Purchasing of Parts and Equipment: Section 2.4 examines the purchasing and materials management functions within the Department. By restoring some personnel, and implementing alternative purchasing strategies, the Department could save several million dollars in parts and equipment costs.

- Farebox Revenue Collection: There are no formalized procedures for the collection and transport of farebox revenue, and delays in the deposit of this money result in a loss of interest income to the City. Failure to maintain farebox equipment that cost MUNI approximately $5.2 million to purchase and install in 1991, do not receive required preventative maintenance, causing MUNI to forego revenue as well as incur excessive depreciation costs.

These findings are discussed in more detail, as follows, in Section 2.

2.1 Special Duty Operators

- **The Municipal Railway has assigned Transit Operators to non-driving duties for many years to provide various clerical, administrative, and support services in the Department. The employees who are placed on these non-driving assignments are termed "Special Duty Operators", or SDOs.**

- **Presently, 53 operators are assigned on a full-time, regular basis to non-driving SDO duties. Further, based on a review of sample pay periods conducted as part of this study, the equivalent of an additional 35.2 FTE operators are assigned to SDO duties on a part-time or intermittent basis.**

- **As a result, as many as 88.2 FTE operators are diverted from normal driving duties even though MUNI is regularly unable to dispatch scheduled service due to a lack of available operators. This practice is costly, is in violation of the current MOU with TWU Local 250A, and is inconsistent with the budget policy established by the Mayor and the Board of Supervisors.**

- **Department-wide, the salaries and benefits for platform operators assigned to special duty equates to approximately $4.9 million per year, much of which represents a loss of service or is backfilled with scheduled overtime. By eliminating this practice, except for operators who fulfill specific union roles or are on temporary light duty status, transit service reliability could be improved and operating costs could be reduced.**

Special Duty Operator (SDO) is a sub-classification of worktime used by transit operators to record time spent performing duties other than those as a Transit Operator. As practiced by the Department of Public Transportation, duties charged to the "special duty operator" category of worktime include a variety of clerical, administrative and support duties, such as office clerk, secretary, and yard starter.

Some transit operators perform and record time in SDO activities on a part-time or intermittent basis. However, approximately 53 other transit operators are assigned to SDO duties on a full-time, regular basis.

Upon our request, we were provided with a list of transit operators who are regularly assigned as full-time SDOs in the Department Headquarters and in the transit divisions. We then reconciled this list with payroll reports detailing actual time charges to the special duty operator category, and adjusted the Department's listing accordingly.

Shown in the table below are the 53 full-time, regular SDO positions discussed previously. Detailed job duties are shown for 11 of these individuals, who are assigned to the Department of Public Transportation headquarters, and for another 13 who are assigned to the Cable Car and Potrero Divisions. Also shown are summary totals for 27 full-time, regular SDO positions assigned to the remaining five transportation divisions. Some of the permanent Special Duty Operators have been acting in that capacity since the early 1980s.

Table 2.1.1

Full-Time, Regular Special Duty Operator Assignments
San Francisco Municipal Railway - April 1996

Assignment Location	Duty Performed	Number of Positions	Total
DPT Headquarters	Passenger Service Clerk	2	
	Elderly and Handicapped Clerk	1	
	Division Operations Clerk	2	
	Director's Office Clerk	1	
	Community Affairs	1	
	Community Outreach	1	
	Division Operations Secretary	1	
	Station Operations Secretary	1	
	Transit Information Clerk	1	11
Cable Car Division	Office Assistant	1	
	Starter	1	2
Potrero Division	Yard Assistant	4	
	Manager's Office	1	
	Clerk	2	
	Clerk/Yard Assistant	1	
	Paymaster/Yard Assistant	1	
	Transfer Collection	2	
	Receiver	1	
	Shop Assistant	1	13
Flynn Division			5
Green Division			4
Kirkland Division			6
Presidio Division			3
Woods Division			9
Total			53

The SDO duties at the Potrero Division are representative of the types of duties performed at the other transit divisions, excluding the Cable Car Division. In addition to the two SDO positions shown, the Cable Car Division uses two light-duty operators (LDOs) in "Tower" duty positions that are not included in Table 1 because we have not included LDOs in our position count of special duty operators. The "Tower" refers to the booth station duty position located at Powell and California Streets that is used to direct cable car traffic intersecting at that location on the Powell Street and California Street Cable Car lines.

In addition to the 53 SDO positions shown in the table, other operators perform SDO duties on either a part-time or intermittent basis. For example, for the pay period ended March 22, 1996, the Potrero Division used an additional 18 positions on SDO assignments, for a total of 31 positions when added to the 13 SDO assignments shown in the table above.

In order to obtain an indication of the total extent of SDO activities, we reviewed the Department's "Special Duty Pay Report", which includes all time charges for Special Duty Operator, Light-Duty Operator, Union Representatives, and a few other minor categories. The table below shows that for the period from February 10, 1996, through March 22, 1996, (the City's Pay Period Nos. 5, 6, and 7), 88.2 full-time positions were charging to the Special Duty Pay category.

Table 2.1.2

Total FTE Special Duty Operator Assignments
February 10 through March 22, 1996
San Francisco Municipal Railway

Location	Recorded Hours By Pay Period and Total				Equivalent Positions
	#5	#6	#7	Total	
DPT Headquarters	754	956	880	2,590	11.2
Cable Car Division	530	600	554	1,684	7.3
Flynn Division	547	535	774	1,856	8.1
Green Division	1,078	1,377	1,286	3,741	16.3
Kirkland Division	609	524	574	1,707	7.4
Presidio Division	533	412	575	1,520	6.6
Potrero Division	1,396	1,330	1,277	4,003	17.4
Woods Division	740	1,137	1,313	3,190	13.9
Total	6,187	6,871	7,233	20,291	88.2

Approximately seven SDO assignments are for Union representation, and approximately 15 SDO positions are assigned to Light-duty Operators (LDOs). The remaining 66.2 positions are used for various clerical, administrative, and support activities within the Department.

The only limitations on the use of Special Duty Operators that we could locate was a side agreement to the Memorandum of Understanding (MOU) between the City and the Transport Workers Union of America, Local 250-A, dated March 23, 1996. This side agreement is shown as Appendix 2.1.1. As stated in that document, transit divisions other than Woods, Potrero, and Kirkland are authorized one full-time special duty operator position. Woods, Potrero, and Kirkland are authorized two such full-time positions, for a total of 10 positions. In actual practice, the Department exceeds this limitation by 78.2 positions -- or nearly eight times the authorized limit.

The selection process for special duty operators is not formalized. However, in response to a question concerning the selection of such operators, the Deputy General Superintendent of Division Operations verbally explained what he understood to be the process and then produced the "Guidelines for Selecting Special Duty Operators" shown in Appendix 2.1.2.

The use of transit operators for special non-driving duties, whether on a regular or intermittent basis, reduces the number of operators who are available to provide direct service. Transit service which is not provided because operators are not available can be significant. For example, MUNI records for Friday, April 5, 1996, shows a total of 107 full time and 13 part time runs which were not dispatched because operators were not available, for a total of 120 runs, as follows:

Table 2.1.3

Missed Runs Due to Operator Availability
San Francisco Municipal Railway - April 5, 1996

	Morning		Afternoon		
Location	Full time	Part time	Full time	Part time	Total
Cable Car Division	0	0	2	0	2
Flynn Division	1	0	20	2	23
Green (Metro) Division	7	2	8	4	21
Kirkland Division	2	1	6	0	9
Potrero Division	10	0	25	0	35
Presidio Division	5	1	8	2	16
Woods Division	3	1	10	0	14
Total	28	5	79	8	120

As shown in the table above, on the morning of April 5, 1996, the Potrero Division reported a total of 10 transit line runs which were not dispatched because an operator was not available. However, the Potrero Division uses 13 transit operators as non-driving SDOs on a full time basis. Had these operators been available to operate a transit vehicle, the number of missed runs due to the unavailability of operators could have been reduced, if not entirely eliminated.

In general, we regard the use of Transit Operators for functions other than operating a vehicle to be costly, in violation of the current MOU with TWU Local 250A, and inconsistent with the budget policy established by the Mayor and the Board of Supervisors. Accordingly, we believe this practice should be terminated as soon as practical.

Special Duty Operator Pay

Some permanent Special Duty Operators sign on to regular transit runs and are paid on the basis of that transit run, which can range for anywhere between straight pay for eight hours to straight pay for eight hours plus overtime for up to 2 hours. According to the Deputy General Superintendent of Division Operations, no Special Duty Operator in the Headquarters is receiving run pay and our review of the Department's pay records confirmed that assertion.

The Deputy General Superintendent of Division Operations also stated that, with the exception of one operator who gets paid for time actually worked, Special Duty Operators working in the Headquarters generally work eight hours per day, but are paid for one additional hour of overtime in order to "compensate them for the reduction in pay they would otherwise suffer by not being allowed to use their seniority to sign onto runs, which often includes overtime." In other words, some MUNI employees are being paid for time not worked, which is an improper practice and which should be terminated immediately. The cost of this practice is approximately $278.70 per day, or $66,888 in unearned overtime compensation per year for the ten special duty operators who are on this pay arrangement at Headquarters.

The Deputy General Superintendent of Division Operations further stated that, as a matter of policy, Special Duty Operators assigned to the transit divisions who sign-up for transit runs are required to operate that run for some part of the day. For example, a transit operator working primarily as an office clerk might sign up for a transit run and would operate a transit vehicle for part of his or her workday. However, our examination of the Department's pay and operational records reveals that some operators who are being paid on the basis of transit runs *do not* operate transit vehicles at all. Others operate transit vehicles only periodically, while some operate transit vehicles on a daily part-time basis. An example of these work/pay arrangements for the pay period ended March 22, 1996, is shown in the exhibit below:

Exhibit 2.1.1

Examples of Work/Pay Arrangement For Special Duty Operators San Francisco Municipal Railway - 1996

Special Duty Operator Position	Pay Basis	Hours Worked[2]	Transit Run Pay Per Day[3]	Straight Regular Pay-Eight Hours	Difference Per Day	Annualized Difference[4]	Hours Driven
Receiver[1]	Transit Run	Up to Eight	$211.65	$148.64	$63.01	$15,122.40	Zero
Clerk	Transit Run	Up to Eight	$213.68	$148.64	$65.04	$15,609.60	1:21 on four days during the pay period

[1] Receivers prepare outfits, consisting of route assignment, schedules, and other papers, for issue to each Transit Operator each day.

[2] The Division "detail" only specifies an eight hour time spread, with no indication of whether time off for a meal is taken.

[3] Based on 8:20 of Straight Regular Time; 1:23 of Regular Overtime; and 0:37 of Night Differential Overtime.

[4] Based on 240 work days.

Thus, the cost of paying run pay, which includes regular overtime and night differential overtime to fund a transit operator functioning as a Receiver, costs $15,122, per year more than would be the pay at the straight operator rate of $18.58 per hour.

Moreover, the additional cost which results from the difference between run-pay and straight-pay does not include the difference between what a transit operator is paid and what the appropriate classification for the job would be paid. For example, in the instance of the Transit Operator - Clerk who drives for one hour and 21 minutes per day, the total annual run pay of approximately $51,283.20 (based on 240 work days, excluding benefits) is $19,441.20 more than the $31,842 salary for classification 1424 - Clerk Typist at the top pay step.

In order to calculate the exact cost of using SDOs in the various positions practiced, it would be necessary to survey and determine the appropriate salary for each position and compare it to the pay being received by the SDO. The task would be complicated by the many variations of work performed by SDOs. For example, some transit operators work a full transit run and then work as an SDO Clerk or Receiver for an additional three or four hours, each day, on an overtime basis. The extent of work necessary to perform such an analysis is beyond the scope of this audit. However, we believe that the cost of using transit operators to perform clerical and administrative functions is costing the City hundreds of thousands of dollars, annually.

Special Assignments

During the course of this audit, MUNI employees informed us of a practice that is permitted by MUNI management, whereby some employees are permitted to take paid time away from work to prepare for a Department sanctioned event. Although not a considerable cost to the City, employees are excused from their regular assignments to cook foods, decorate, and perform other preparations for such events as the MUNI Operator Recognition Program, parties for MUNI managers or other employees who are terminating employment, etc.

We were provided with the "detail" from one of the transit divisions for January 26, 1996, which shows that three operators were placed in Special Assignment status for the day to prepare for a party for a MUNI manager. We were informed that the practice described is one of long standing and occurs approximately once per month. Although we concur that MUNI employees should be allowed to participate in events which recognize fellow workers, and see benefits to such events as mechanisms to sustain employee morale, City rules, regulations, and policies do not permit the use of paid time to prepare for such occasions. The practice should be terminated immediately.

Conclusions

The Municipal Railway has assigned Transit Operators to non-driving duties for many years to provide various clerical, administrative, and support services in the Department. The employees who are placed on these non-driving assignments are termed "Special Duty Operators", or SDOs.

Presently, 53 operators are assigned on a full-time, regular basis to non-driving SDO duties. Further, based on a review of sample pay periods conducted as part of this study, the equivalent of an additional 35.2 FTE operators are assigned to SDO duties on a part-time or intermittent basis.

As a result, as many as 88.2 FTE operators are diverted from normal driving duties even though MUNI is regularly unable to dispatch scheduled service due to a lack of available operators. This practice is costly, is in violation of the current MOU with TWU Local 250A, and is inconsistent with the budget policy established by the Mayor and the Board of Supervisors.

The salaries and benefits for these employees equates to approximately $4.9 million per year, much of which represents a loss of service or is backfilled with scheduled overtime. By eliminating this practice, except for operators who fulfill specific union roles or are on temporary light duty status, transit service reliability could be improved and operating costs could be reduced.

Recommendations

The Director of Public Transportation should:

2.1.1 Issue a directive to all MUNI managers to immediately discontinue the use of Special Duty Operators, except for light duty and the ten positions permitted by the MOU with TWU Local 250A.

2.1.2 Discontinue the practice of paying overtime to Special Duty Operators in MUNI Headquarters, for time not actually worked.

2.1.3 Discontinue the practice of permitting full-time, regular Special Duty Operators to sign-up for transit runs, or be compensated on the basis of transit run pay.

2.1.4 Discontinue the practice of permitting paid, excused absences.

Costs and Benefits

There will be no cost to implement these recommendations.

A precise estimate of potential savings cannot be calculated due to limitations in the scope of this management audit. However, we believe that by eliminating the practice of making excessive SDO assignments transit service reliability could be improved, and operating costs related to the $4.9 million in SDO salaries could be reduced by several hundred thousand dollars per year.

2.2 Special Duty Maintenance Workers

- **The Maintenance Division has had as many as 22 employees reassigned to special duties. These administrative transfers, along with 74 budgeted positions kept vacant to achieve a seven percent salary savings, have decreased MUNI's capability to meet its repair and maintenance needs.**

- **As of April 1996, 11 of the 22 employees have been transferred back to their originally assigned duties. An additional three employees should be restored to their previous duties, to bring the total number to 14 employees. In addition, 21 new employees will be hired as part of MUNI's current Maintenance Stabilization Program and up to 26 vacant position not affected by the current salary savings cap can be filled.**

- **MUNI has requested $459,335 in its 1996-97 budget submission to fill 11 vacant positions, which would reduce the Department's current salary savings from 7.0 to 6.3 percent. Before reducing its salary savings and hiring additional employees, MUNI should evaluate the impact from: (1) restoring the 14 employees to their previous duties, (2) hiring 21 employees in newly approved positions and (3) filling up to 26 vacant positions not affected by current salary savings requirements which in total are estimated to cost $3.2 million annually in labor costs.**

Based on data reported for April 1996, MUNI's Maintenance Division had 1,094 budgeted positions, of which 994 were filled and 100 were vacant, of which 74 have been held vacant to meet the Department's seven percent budgeted salary savings rate for FY 1995-96. The remaining 26 vacant positions (100 less 74) are the result of the Maintenance Division's normal turnover of 1,094 total positions. In addition, eleven filled positions are presently reassigned to other non-maintenance responsibilities and divisions, and were therefore not performing regular maintenance duties. In total, the Department had 111 unfilled or reassigned maintenance worker and mechanic positions that were not performing maintenance duties in April 1996. There was no change in the total number of positions either vacant or reassigned from the previous July 1995. At that time, 89 positions were vacant and 22 filled positions were reassigned to other maintenance duties or to responsibilities in other MUNI divisions. A presentation of this historical data is provided in the table, below:

Table 2.2.1
A Comparison of Unfilled and Reassigned Positions
San Francisco Municipal Railway
July 1995 and April 1996

Total Number and Percent of All Budgeted Positions[1]

Position Status	July 1995		April 1996		Inc. (Dec)	
Unfilled	89	8.1%	100	8.7%	11	1.0 %
Filled but Reassigned	22	2.0%	11	1.0%	(11)	(1.0)%
Totals	111	10.1%	111	9.7%	0	0 %

The 11 currently filled but reassigned positions performing non-maintenance functions are shown below:

Table 2.2.2
Maintenance Division Positions
Assigned to Other Duties and Responsibilities
San Francisco Municipal Railway - April 1996

Class	Position Title	Reassigned Function	Status
1426	Senior Clerk Typist	Director's Office	Position vacant
1844	Senior Management Assistant	Director's Office	Assigned to Personnel
7379	Electrical Transit Mechanic	Director's Office	Assigned to Chief of Staff
7379	Electrical Transit Mechanic	Finance, Adm, Personnel Division	Assigned to Health and Safety[2]
7379	Electrical Transit Mechanic	Management Information Systems Specialist	Awaiting Certification as a Class 1819
7379	Electrical Transit Mechanic	Work Scheduler and Coordinator-Trolley	Continue in this Capacity

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[1] Total budgeted positions were 1,094 in FY 1995-96.

[2] This position is presently budgeted in Finance, Administration, and Personnel.

Table 2.2.2 (Continued)

Maintenance Division Positions Assigned to Other Duties and Responsibilities San Francisco Municipal Railway - April 1996

Class	Position Title	Reassigned Function	Status
7379	Electrical Transit Mechanic	Work Scheduler and Coordinator- LRV	Continue in this Capacity
7379	Electrical Transit Mechanic	Technical Assistant to General Superintendent	Budgeted for this Function
7379	Electrical Transit Mechanic	Technical Assistant to General Superintendent	Budgeted for this Function
7380	Electrical Transit Mechanic Assistant Supervisor	Parts Coordinator	Budgeted for this Function
7409	Electrical Transit Service Worker	VMS Data Entry	Awaiting report on ADA Accommodation

We recommend that three additional employees, as identified below, who are currently working in other MUNI divisions be restored immediately to the Maintenance Division. We also recommend that the remaining eight employees continue with their delegated tasks, pending recommendations from the Department of Human Resources on reclassification. Descriptions of the 11 positions are as follows:

Immediate Transfer Back to Previous Duties

(1) 1426 Senior Clerk Typist position is currently vacant. It should be returned to Maintenance Division and shared equally between a proposed half-time position for Materials Management and a proposed half-time position for the Warranty Administrator (the recommendation for this position is discussed in Findings 2.4 and 4.2 respectively).

(1) 7379 Electrical Transit Mechanic position assigned to Chief of Staff should be returned to the Maintenance Division. The position of Assistant Chief of Staff is an unnecessary level of management supervision;

(1) 1844 Senior Management Assistant position in the Personnel Unit should be funded directly from that Division and the current employee returned to the Administrative Services Section;

Transfer Pending Reclassification Determination

(1) 7379 Electrical Transit Mechanic position transferred to the Health and Safety Unit should be reviewed by the Department of Human Resources to determine the appropriate classification for this position and whether the transferred classification is properly assigned;

1) 7379 Electrical Transit Mechanic position awaiting certification as a Class 1819 Management Information Systems Specialist should complete that intended reclassification;

(4) 7379 Electrical Transit Mechanic should continue in their capacities as work schedulers and coordinators and technical assistants to the General Superintendent for Electrical Maintenance pending reclassification by the Department of Human Resources;

(1) 7380 Electrical Transit Mechanic, Assistant Supervisor should continue in the capacity of parts coordinator in determining what materials will be needed to facilitate new LRV repair campaigns;

(1) 7409 Electrical Transit Service Worker has been reassigned to VMS data entry in order to accommodate Americans with Disabilities Act (ADA) provisions.

As identified in Table 2.2.1 above, 11 positions have already been restored to the Maintenance Division and assigned to regular duties commensurate with their classifications. In addition, 3 of the remaining 11 positions should be restored as identified in Table 2.2.2. A listing of these 14 classifications (11 already restored plus 3 recommended for immediate restoration to previous duties), and the corresponding annual cost of $844,900 for salaries and fringe benefits, are as follows:

Table 2.2.3

Maintenance Employees Working Out of Class and/or Division Positions Already and Recommended to be Restored

Class	Title	Bi-Weekly Range	Number	Total Cost	
Positions Already Restored					
7313	Automotive Machinist	1,839-1,839	1	$47,814	
7318	Electronic Maintenance Technician	2,043-2,483	1	64,558	
7335	Senior Stationary Engineer	1,618-1,965	1	51,090	
7379	Electrical Transit Mechanic	1,506-1,827	3	142,506	
7381	Automotive Mechanic	1,810-1,810	5	235,300	
	Subtotal		11		$540,818

Table 2.2.3 (Continued)

Maintenance Employees Working Out of Class and/or Division
Positions Already and Recommended to be Restored

Class	Title	Bi-Weekly Range	Number	Total Cost	
Positions Recommended to be Restored					
1426	Senior Clerk Typist	1,104-1,336	1	34,736	
1844	Senior Management Assistant	1,674-2,033	1	52,858	
7379	Electrical Transit Mechanic	1,506-1,827	1	47,502	
	Subtotal		3		135,096
	Fringe Benefits		_		168,986
	Total		14		$844,900

In response to MUNI Maintenance Stabilization program, the Board of Supervisors has approved 21 new positions (15.75 FTEs)[3] to the FY 1996-97 MUNI Maintenance Budget for an annual cost of $1,044,000. The 21 new positions include seven 1929 Parts Storekeepers, one 7355 Truck Driver, four 7540 Track Maintenance Workers, one 7514 General Laborer and one 7215 General Laborer Supervisor I, two 7318 Electronic Technicians, two 2708 Custodians, two Electrical Line Workers and one 7329 Electronic Maintenance Technician Assistant Supervisor. Therefore, total budgeted Maintenance Division positions are increasing from 1,094 to 1,115.

As noted earlier, the Maintenance Division had 26 vacant positions in April 1996 not attributed to the 74 positions held vacant to meet the Department's seven percent budgeted salary savings rate. The estimated annual cost for these 26 vacant positions is estimated to be $1,292,500.[4]

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[3] Each position is funded for a nine month period and some funds have been reserved.

[4] Based on an average annual cost of $49,712 including salary and fringe benefits for newly approved positions in the 1996-97 budget.

Reduction to the Existing Level of Salary Savings

MUNI is requesting a reduction to its current level of salary savings, which represents the filling of 11 vacant positions for an estimated 9-month cost (8.25 FTEs) of $459,335 which is currently on reserve. The annualized cost for these 11 positions is $612,447. The positions are detailed as follows:

Table 2.2.4

Vacant Maintenance Employees Positions to be Added MUNI Recommendation to Reduce Salary Savings from 7.0 to 6.3 %

Class	Title	Bi-Weekly Range	Total FTE	Total Cost	
2708	Custodian	1,062-1,285	0.75	$34,736	
7322	Automotive Body and Fender Worker Assistant Supervisor	2,261-2,261	0.75	44,259	
7347	Plumber	1,909-2,319	0.75	45,395	
7379	Electrical Transit Mechanic	1,506-1,827	1.50	71,528	
7381	Automotive Mechanic	1,810-1,810	0.75	35,431	
7410	Automotive Service Worker	1,152-1,394	0.75	26,525	
9102	Transit Car Cleaner	1,180-1,429	3.00	106,632	
	Subtotal		8.25		$354,102
	Fringe Benefits				105,233
	Total		8.25		$459,335
	Annualized Total		11.00		$612,447

Our analysis indicates that with the restoration of the 14 positions identified in Table 2.2.3, the filling of up to 26 vacant positions that are not affected by the current seven percent budgeted salary savings rate, and the adding of 21 new positions to provide maintenance stabilization, the potential number of additional dedicated positions in the Maintenance Division would be 61.

MUNI should delay the reduction to salary savings until the full impact of adding and restoring up to 61 positions (restoring 14 employees to the Maintenance Division line duties, filling up to 26 vacant positions not affected by the seven percent salary savings cap, and adding of 21 new positions), in total representing nearly $3.2 million annually in labor costs, have been fully evaluated. Until that evaluation is completed, the $459,335 requested for salary savings reduction should continue to be reserved.

Conclusions

The Maintenance Division has had as many as 22 employees reassigned to special duties. These administrative transfers, along with 74 budgeted positions kept vacant to achieve a seven percent salary savings, have decreased MUNI's capability to meet its repair and maintenance needs.

As of April 1996, 11 of the 22 employees have been transferred back to their originally assigned duties. An additional three employees should be restored to their previous duties, to bring the total number to 14 employees. MUNI has also added 21 new positions (15.75 FTEs) in FY 1996-97 as part of its Maintenance Stabilization Program, and has the potential to fill 26 additional vacant positions not subject to the seven percent salary savings cap currently required. In total this represents 61 positions and nearly $3.2 million annually in salaries and fringe benefits.

MUNI has requested $459,335 in its 1996-97 budget request to fill 11 vacant positions, which would reduce the Department's current salary savings from 7.0 to 6.3 percent. Before reducing its salary savings, MUNI should evaluate the impact from restoring the 15 employees to their previous duties, filling up to 26 vacant positions not subject to the seven percent salary savings cap and the hiring of 21 new positions.

Recommendations

The Director of Public Transportation should:

2.2.1 Restore three positions (1-1426-Senior Clerk Typist, 1-1844-Senior Management Assistant and 1-7379 Electrical Transit Mechanics) to the Maintenance Division as identified in Table 2.2.3 above.

The Board of Supervisors should:

2.2.2 Continue to reserve $459,335 in salary savings reductions until MUNI management provides a report on the impact of restoring 14 employees to line duties, hiring up to 26 vacant positions not subject to the seven percent salary savings cap and hiring 21 new positions in the Maintenance Division, and a report on how the additional positions will fulfill vitally needed maintenance work.

The Department of Human Resources should:

2.2.3 Review the status of eight positions (6-7379 Electrical Transit Mechanic, 1-7380 Electrical Transit Mechanic, Assistant Supervisor and 1-7409 Electrical Transit Service Worker) to determine the appropriate classifications associated with performing work out of the current classification.

Costs and Benefits

Evaluation of the 14 restored positions, the filling of up to 26 vacant positions not subject to the current seven percent salary savings cap and the 21 new positions added to the Maintenance Division, which in total represents nearly $3.2 million annually in labor costs. All of these positions may be sufficient to fulfill additional needed maintenance work for MUNI's purposes and thus avoid adding positions estimated to cost $459,335.

2.3 Fuel Waste, Engine Wear, and Air Pollution

- **Although diesel bus manufacturers and MUNI policy recommend starting diesel buses only 15 minutes before early morning pull-out, maintenance service workers routinely start diesel buses at 2:30 a.m. at the Kirkland and Woods yards.**
- **Thus, diesel bus motors idle for at least two and one-half hours and as much as four and one-half hours until they are placed into service between 5:00 AM and 7:00 AM. This practice wastes fuel, pollutes the air, and adds unnecessary wear to the diesel engines.**
- **By correcting this practice, MUNI would save an estimated $670,000 annually in lost fuel and diesel engine repair costs. In addition, MUNI would reduce air pollution generated by the diesel buses, which for one weekday is the equivalent of idling nearly 56,000 passenger vehicles for one hour.**

MUNI has a policy regarding the preparation of buses for early morning pull-out which specifies that diesel engines be started 15 minutes before the bus leaves on its scheduled run. This policy agrees with recommended manufacturer standards that state that diesel engines be warmed-up a maximum of 15 minutes prior to being placed "under load", which is sufficient to raise the engine temperature to an operating level, and to provide sufficient air pressure and power necessary to activate passenger lift pumps and other auxiliary systems.[1]

Specifically, these manufacturers state that extended engine warm-up results in excessive fuel usage, abnormally high levels of air pollution, and extensive engine and component wear; and that the level of exhaust and engine wear is higher when a bus is operating at idle than when it is operating on the road. Thus, diesel engines are operating at their least efficient levels when at idle.

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[1] Manufacturers include representatives from Flxible Corporation, Detroit Diesel, Russett Diesel and M.A.N.

This procedure is not followed at the Woods and Kirkland Bus Yards, which provide outside parking for a total of 262 diesel buses required for early morning pull-out during weekdays (140 at Woods and 122 at Kirkland).[2] Kirkland Bus Yard is an open parking lot adjacent to commercial and residential properties and Woods is an open parking lot in a generally light industrial area between 3rd Street and Interstate 280.

Based on our observations of operations at the Woods and Kirkland Bus yards during early morning hours, we observed Auto Service Workers starting diesel bus engines from 2:30 A.M. until 3:00 A.M. until all bus engines had been started. The engines remained idling until all buses were placed into service between 5:00 A.M. and 7:00 A.M. These diesel buses are left to idle an average of approximately 3 hours and 15 minutes before early morning pull-out occurs.

Wasted Fuel

A recent study undertaken by the Department of Energy's Argonne National Laboratory found that if a diesel engine idles an average of three hours each work day, an estimated 800 gallons of fuel are wasted each year.[3] Based on the average diesel fuel cost of $0.74 per gallon (reported during the period of this study) and the practice of idling 262 diesel buses on weekdays, and 130 on weekends to meet the morning run demands, an estimated $175,000 in fuel costs are wasted annually. This is a conservative estimate of cost since fuel prices have escalated in recent months.

Excessive Engine Wear

Engine wear is another factor. The Argonne National Laboratory study also found that unnecessary idling of a diesel engine could shorten its life by as much as 12 months. The study indicated that idling causes twice as much damage to a diesel engine as driving. A diesel engine idling for about 800 hours a year (which is the approximate length of time that the buses at Woods and Kirkland idle during the early morning hours) is equivalent to driving 87,360 miles.[4] MUNI estimates that the standard 40 foot diesel bus records 32,000 driven miles per year. Under those circumstances, the equivalent total annual mileage from driving and the wear and tear from idling is nearly 120,000 per year.[5] Thus, the 32,000 miles driven annually represents only 27 percent of the total 120,000 miles which can annually be attributed to both driving and engine wear from excessive idling.

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[2] On weekends 75 diesel buses at Woods and 57 diesel buses at Kirkland are required.

[3] LaBelle, Sarah J., *Don't Idle Your Profits Away,* Center for Transportation Research, Energy and Environmental Systems Division, Argonne National Laboratory, work sponsored by U. S. Department of Energy, October, 1986 (see Appendix 2.3.1).

[4] Ibid., assumes 80 miles of wear per hour of idling, page 3.

To comply with federal requirements, diesel engine manufacturers are generally required to provided bus engines that operate for 300,000 miles without major failure or significant deterioration. MUNI maintenance managers advised that engine replacement occurs only two and at the most three times during the 12 year standard life of the diesel bus (once every four to six years).[6]

MUNI maintenance managers discount the effect that excess idling has on the life of the diesel engines. We believe, however, that excess wear does occur and that either more periodic maintenance work is required or engine replacement must be scheduled more frequently. We estimate that the current practice of excess idling adds the equivalent of at least one additional engine replacement during the life of diesel bus, either with the cost of an actual replacement or with the equivalent cost of additional maintenance resulting from the idling. Currently, there are 331 diesel buses in the active fleets at Kirkland and at Woods facilities, of which 262 must be available for early morning pull-outs. Based on the average cost of engine replacement totaling $20,570 per engine, the additional cost for one additional engine replacement and/or its equivalent added maintenance cost over the course of 12 years would be an estimated $565,800 annually.[7]

Total estimated annual savings from (1) reduced fuel consumption ($175,000) and (2) fewer diesel engine replacements and/or equivalent savings in maintenance cost ($565,800), would be $740,800.

Unnecessary Air Pollution

The excessive idling of the diesel buses at Woods and Kirkland Bus Yards also generates excessive amounts of nitrogen oxide pollutants into the atmosphere. Based on data provided by the Bay Area Air Quality Management District and the

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[5] Actually 119,360 miles per year for wear, including 32,000 miles from driving and 87,360 miles from idling.

[6] However, at the present time, MUNI maintenance personnel indicate that, on average, 130 engines are replaced each year (10 to 12 per month) for their standard 40 foot diesel bus fleet. Based on this current rate, engine replacement occurs about once every three years in contract to their general replacement practice of four to six years.

[7] Over a 12 year period an additional engine replacement for 331 diesel buses would average 27.5 buses per year.

California Air Resources Board, an idling standard-size diesel bus emits 170 grams of nitrogen oxide per hour. In comparison, a passenger car that complies with the State of California emission standards emits 2.4 grams of nitrogen oxide per hour. Therefore, a diesel bus' emission is 70.8 times greater than the emission of a passenger car. Under these circumstances, the equivalent emission of pollutants for the diesel buses is approximately 55,700 passenger cars idling for one hour, which has been computed, as follows:

Table 2.3.1

A Comparison of Idling Diesel Buses and Passenger Cars Emissions of Nitrogen Oxide Pollutants into the Atmosphere

	Pollutants in Grams	Equivalent Passenger Vehicles
Idling Diesel Bus Nitrogen Oxide Pollutant Emission per Hour	170	
Number of Hours of Idling per Bus	X 3	
Total Nitrogen Oxide over 3 Hours of Idling Diesel Bus	510	
Total Number of Buses	X 262	
Total Nitrogen Oxide from Buses Ready for Morning Pull-out	133,620	
Idling Passenger Car Nitrogen Oxide Pollutant Emissions p/Hour	•/• 2.4	
Total Number of Equivalent Passenger Cars Emitting Nitrogen Oxide for One Hour		55,675

Maintenance supervisors have argued that the buses are started earlier than stated in the Department's policy because existing parking spaces at the yards are crowded. In addition, they believe there are insufficient Auto Service Workers (yard starters) available during the morning pull-out to relocate disabled buses so that other buses have a clear egress from the facility. Even if an additional two yard starters on graveyard shift were required at these yards, one each at Woods and Kirkland, to assist with implementation of the 15-minute start-up policy and to relocate disabled buses, savings to the Department would exceed $1 million per year.

These two positions would cost $70,800, as follows:

Table 2.3.2

Additional Staff Annual Cost Associated with Early Morning Pull-out of Diesel Buses at Woods and Kirkland

Class	Title	Number	Bi-Weekly	Annual Cost
1740	Auto Service Worker	2	1,088-1,316	$56,576
	Fringe Benefits			14,224
	Total			$70,800

Based on estimated annual cost reductions for fuel and engine repairs totaling $740,800, offset by additional annual personnel costs of $70,800 to facilitate early morning pull-outs, MUNI would save an approximate net amount of $670,000 from complying with its own policy and engine manufacturers recommendations to warm-up diesel engines for 15 minutes prior to early morning pull-out.

Conclusion

Although diesel bus manufacturers and MUNI policy recommend starting diesel buses only 15 minutes before early morning pull-out, maintenance service workers routinely start diesel buses at 2:30 a.m. at the Kirkland and Woods yards.

Thus, diesel bus motors idle approximately three to four hours until they are placed into service between 5:30 AM and 7:00 AM. This practice wastes fuel, pollutes the air, and adds unnecessary wear to the diesel engines.

By correcting this practice, MUNI would save an estimated $670,000 annually in lost fuel and diesel engine repair costs. In addition, MUNI would reduce air pollution generated by the diesel buses, which for one weekday is the equivalent of idling nearly 56,000 passenger cars for one hour.

Recommendations

The Public Transportation Department should:

2.3.1 Comply with MUNI's own policy as well as the recommendations of diesel engine manufacturers regarding the start-up of diesel buses which require that the engines be started only 15 minutes before early morning pull-out.

2.3.2 Add two additional auto service workers to assist with the starting of the diesel buses, one each at Woods and at Kirkland Bus Yards.

Costs and Benefits

Unnecessary fuel usage and engine wear and tear will be substantially reduced for an estimated savings of $670,000 annually. Air pollution emission of nitrogen oxide equal to the idling of nearly 56,000 passenger vehicles will be eliminated thus improving the general air quality for the San Francisco Bay Area.

2.4 Purchasing Parts and Equipment

- **MUNI currently has 24,350 vehicle parts valued at approximately $23.5 million which are stored at nine different maintenance locations in the City.**
- **MUNI needs to implement stricter security measures that will protect their assets and/or mistakes in recording inventoried parts. Although MUNI has requested seven additional parts storekeepers, three would be sufficient to facilitate expanded maintenance swing and weekend shifts. Further, Materials Management staff should review current practices to identify more competitive prices or alternatives to fabricate parts in-house.**
- **For example, a review of the existing wheel chair lift overhaul operations found that repairs could be done at less cost either by purchasing less expensive parts or by fabricating parts in-house. Potential savings with the overhaul and repair of 280 wheelchair lifts could be substantial but are unknown until Materials Management completes a full review of the alternative purchasing options.**
- **In addition, 20 new diesel engines were purchased over two years ago, but never installed. Because the total cost may exceed $2.3 million, the Public Transportation Department should consider selling the engines and implementing an alternate program of engine repair that should save an estimated $1.1 million.**

The Transportation Department has a currently reported inventory of parts and equipment in its automated parts tracking system, Materials Management System (MMS), that exceeds 24,350 items with a current estimated value of $23.5 million. As of March of 1996, the number and value of these parts and equipment are distributed at nine[1] separate maintenance and storage facilities, as follows:

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[1] Pier 72 is a tenth parts storage facility that is used as an overflow for other facilities that have overcrowded storerooms. Parts stored here are identified with one of the other nine storerooms.

Table 2.4.1

Department of Public Transportation Parts Storerooms
Current Number and Value of Indexed Items in Inventory

Storeroom Location	Number of Items	Value of Items
Muni Metro Rail Center (Green Annex)	5,258	$9,640,605
Potrero Division Trolley Coach Facility	2,848	3,808,636
John M. Woods Diesel Bus Center	5,957	4,261,929
Overhead Lines, Bryant Substation	1,053	2,426,590
Flynn Center Maintenance Facility	3,890	2,456,520
Presidio Car Barn	2,028	473,165
Kirkland Bus Yard	1,133	206,154
Cable Car Power House	422	160,885
William H. Scott Maintenance Facility	1,765	87,529
Totals	24,354	$23,522,013

Included in the annual parts inventories but not included in the MMS are an estimated several hundred parts. For example, the recently completed inventory of the Potrero Division Trolley Coach Facility identified 3,120 items by coded stock number compared with 2,958 items accounted for in the MMS,[2] a difference of 162 items. According to the Supervising Parts Storekeeper, many of these parts identified in the inventory but not recorded in the MMS are no longer manufactured, are not readily obtainable through the City's procurement system, are cheaper to manufacture in-house, and/or are the result of special orders not recorded in MMS.[3] Therefore, the value of MUNI's current inventory identified in the MMS is only an approximation because of the faulty inventory control system.

The Materials Management Department, a unit within the administrative services section of the Maintenance Division, operates the MMS. This automated system furnishes information on the amount of all material in stock by tracking the material issued and received by the individual storerooms. Storekeepers are responsible for issuing and recording the parts requisition on the inventory system and for ordering replacement parts, as needed, to maintain the storerooms' on-hand supply. The current computerized inventory system was developed in FY 1983-84 and is dependent upon the accuracy of information entered by parts storekeepers and inventory clerks. In practice, storeroom staff do not always follow procedures for ensuring that issued stock items are properly entered into the system. This reduces the system's accuracy because staff cannot readily verify the disposition of parts entering or leaving the storeroom.

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[2] The MMS identifies 2,848 items with designated reorder points and 110 items without such reorder points.

[3] Excluded from the MMS is the purchase of 20 Sierra Diesel engines valued at $420,000 stored at Pier 72 since February 1994.

The introduction of barricading would assist in tracking parts to individual transit vehicles and would assist maintenance controllers and planners in determining alternative courses of action for the repair of vehicles.

Inventory Control

In 1995, inventories at the nine storeroom sites had an unrecorded variance of $1.43 million, which was 6.6 percent of the total inventory value of $21.6 million (during the last six months, inventory values have increased $1.9 million from $21.6 to $23.5 million). This $1.43 million inventory variance includes a positive adjustment of $605,406 and a negative adjustment of $828,229. Thus, $828,229 in inventoried parts are either missing or not properly accounted for, and $605,406 in parts are actually in stock but not recorded in the inventory records. The individual results of the most recent inventories for the nine storerooms are as follows:

Table 2.4.2

1995 Inventory Results from MUNI Storerooms

Storeroom Location	Positive Adjustment	Negative Adjustment	Inventory Variance	Net Dollar Adjustment
Muni Metro Rail Center	$179,335	$195,735	$375,070	$16,400
Potrero Div. Trolley Coach	193,142	233,775	426,917	40,633
Woods Diesel Bus Center	169,701	241,693	411,394	71,992
Overhead Lines	21,431	42,239	63,670	20,808
Flynn Center Facility	26,746	42,870	69,616	16,124
Presidio Car Barn	4,706	17,350	22,056	12,644
Kirkland Bus Yard	7,774	43,143	50,917	35,369
Cable Car Power House	2,097	7,056	9,153	4,959
Scott Maintenance Facility	474	4,368	4,842	3,894
Totals	$605,406	$828,229	$1,433,635	$222,823

Stock physically in inventory but not recorded in inventory records can increase City costs in at least two ways. First, items that are in stock but not recorded in inventory can be stolen with little chance of detection. Second, the storekeepers are likely to order more material than is actually required when their inventory records incorrectly indicate that a stocked item should be reordered. MUNI staff have suggested many reasons why items listed in the inventory records might be improperly accounted for or missing. These are described below:

- The issuing of a part could be improperly recorded in the inventory system;
- Parts could be stolen from the storeroom;
- Storeroom staff could err when entering the receipt of an item into the inventory system; and,
- Other staff could make data entry errors in the materials management system (MMS).

Enhancing Storeroom Security and Expanding Parts Issuing Hours

Our on-site observations and discussions with store keeping staff found that unauthorized maintenance staff can enter some of the storerooms (Metro, Woods and Flynn in particular) because keys and cards to the security systems are available to maintenance staff other than authorized storekeepers. Swing and graveyard maintenance personnel at Metro are known to have entered the storerooms during their shifts for the purpose of making personal phone calls. Although storekeeper phones are now secured each evening, other phones have been brought into the storeroom so that personal phone calls can continue. Although Materials Management has advised the General Superintendent for the Metro Facility in writing on this matter, no action has been taken to correct this continuing breach of security.

To expand the number of hours that the parts storerooms are available to maintenance personnel, MUNI has budgeted an additional nine Material Management positions, seven Parts Storekeepers, one Truck Driver and one Senior Clerk Typist. MUNI explains that since 1987 these nine positions have been reduced due to the City's continuing budget crisis.[4] Our analysis shows that six rather than nine positions (including four rather than seven Parts Storekeeper positions) have been reduced, based on authorized positions, as follows:

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[4] During the audit period, a Truck Driver from the Woods Maintenance Facility was transferred to Material Management to support parts storekeeping activities.

Table 2.4.3

Comparison of Authorized Storekeeping Positions San Francisco Municipal Railway - Fiscal Years 1986/87 and 1994/95

Classification Number and Title		Total Positions FY 1986/87	Total Positions FY 1994/95	(Increase) Decrease
1929	Parts Storekeeper	0	23	(23)
1931	Senior Parts Storekeeper	0	5	(5)
1932	Assistant Storekeeper	1	0	1
1934	Storekeeper	29	1	28
1935	Principal Parts Storekeeper	0	2	(2)
1936	Senior Storekeeper	7	1	6
1937	Supervising Parts Storekeeper	0	1	(1)
	Totals	37	33	4

Because the parts ordering function, along with three parts storekeepers to do assistant purchasing functions, has been transferred and centralized at Pier 80, parts storekeepers should have more time to receive and issue parts. Material Management supervisors should examine opportunities to reschedule the time of remaining parts storekeepers to increase the number of hours that parts can be issued. We recommend the addition of only three of the seven storekeepers being requested by the Department, which would increase the number of storekeeping personnel from 33 to 36. This increase would permit the parts counter to be open between 6 A.M. and 7 P.M. from Monday through Friday, and between 8 A.M. and 5 P.M. on weekends, rather than a 24-hour, seven day per week operation. These hours should provide mechanics with sufficient time to request parts for their immediate assigned work. We also recommend that only night and weekend supervisors be allowed into storerooms, and be held accountable for entering and issuing parts to maintenance staff after these extended hours.

MUNI's budget proposal also includes the addition of a truck driver to move overflow between facility storerooms and Pier 72, and a Senior Clerk Typist to fulfill clerical duties at Pier 80. We concur with the addition of the Truck Driver which would allow the currently assigned mechanic to return to bus repair work. We recommend that a Senior Clerk Typist be shared equally between Materials Management and a proposed Warranty Administrator position.[5] Since this position is currently budgeted, no additional funding would be needed. A comparison of

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[5] A Senior Clerk Typist position is currently vacant, but was previously transferred to the Director's Office. This position should be returned to the Maintenance Division as discussed in Section 2.2 of this report.

MUNI's current budget proposal[6] and this recommendation would reduce the proposed budget increase by an estimated $178,370 from $340,640 to $162,270 as follows:

Table 2.4.4

A Comparison of Proposed Budget Increases The Addition of Parts Storekeeper Positions

Class	Title	MUNI Proposal Number	MUNI Proposal Cost	BA Proposal Number	BA Proposal Cost	Difference Number	Difference Cost
1929	Parts Storekeeper	7.0	$204,613	3.0	$87,692	4.0	$116,921
7355	Truck Driver	1.0	42,042	1.0	42,042	0.0	0
1426	Senior Clerk Typist	1.0	25,777	0.0	0	1.0	25,777
	Subtotal	9.0	272,432	4.0	129,734	5.0	142,698
	Fringe Benefits	—	68,208	—	32,536	—	35,672
	Totals	9.0	$340,640	4.0	162,270	5.0	$178,370

Purchasing Department Support

The Transportation Department Materials Management unit currently pays for eight Purchasing Department staff to support their needs, but currently receives only 2.5 staff hours in direct purchasing services. The other positions are assigned to central purchasing duties per MUNI's contribution commitments to the General Fund. Direct purchasing services should be increased to five staff, doubling the current commitment, and be physically moved to MUNI's new centralized materials management location at Pier 80. Combining these services at one location will improve the efficiency and effectiveness of the ordering process by increasing the number of purchasing agents to facilitate parts ordering in a timely fashion and bringing them to the same location to promote ready communications within the purchasing process. Proposition M provides for the separation of MUNI from PUC which should allow the Purchasing staff assigned to MUNI to relocate to the new centralized facilities. The Public Transportation Commission should urge, and the Mayor should direct the Purchaser to relocate the purchasing staff.

As noted earlier, the overall duties of the parts storekeepers at the various store locations have been reduced to the receiving and issuing of parts, which will allow the expansion of time that the parts counter can be open for the issuing of parts. By consolidating the ordering and inventory control functions at Pier 80, three storekeepers have been transferred temporarily from each of the Metro, Woods and Flynn Facilities to assume the duties of Assistant Purchasers.[7]

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[6] MUNI Maintenance Division Proposed Budget, revised April 15, 1996, page 8.

Tracking and Reducing Part Costs

As noted earlier, MUNI uses an antiquated and labor intensive computer system (MMS) to keep track of parts and equipment. It has only been used in a limited capacity to integrated parts information with data entered into the Vehicle Maintenance System (VMS). The relation of parts and vehicle repair and maintenance is important because it provides MUNI maintenance controllers and planners key data regarding the frequency of use and cost of parts for maintaining the fleet. Management Information System (MIS) staff are currently reviewing newer stand alone computer systems and software programs that could integrate processes such as bar coding that could track the use of parts more efficiently.

Another important objective would be to put into place a continuing review of parts pricing. This was done on a limited basis as was reported internally by MUNI with the alternate pricing for the overhaul and repair of wheel chair lift units installed on MUNI diesel buses.[8]

As reported, Wheel Chair Division machinists found that 54 component parts out of a total 102 parts for the overhaul and repair of wheel chair lift units could be either fabricated or found at a less expensive price than is currently provided by an existing vendor contract. The report concludes that 24 components could, as an alternative, be fabricated or rebuilt, and an additional 30 parts could be found from alternate vendors at a lesser price. Based on an initial review and conclusion that 280 diesel buses and electric trolley coaches should be repaired over the next several years, a potential savings of $2.2 million in component wheel chair parts was identified as follows:

Although the Deputy Director of Maintenance has reviewed the report several months ago and acknowledges that its implementation would lead to increased competition and lower prices, no action has been initiated to make changes to the current wheel chair lift repair and overhaul program. Potential savings with the overhaul and repair of 280 wheelchair lifts could be substantial but are unknown at this time until Materials Management completes a full review of the alternative purchasing options presented in the machinists' report.

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[7] Three vacant Parts Storekeeper positions have been reassigned to Assistant Purchasing positions and await action by the Department of Human Resources to identify eligible candidates for the positions.

[8] Based on information entitled "Wheel Chair Division, Repair & Overhaul Component List", prepared by Technical Services, MUNI Diesel Division, August, 1995. A summary of their cost analysis is provided in Appendix 2.4.1 of this report.

As noted above, some parts and equipment are not indexed in the MMS including the purchase of 20 Sierra Detroit Diesel engines for a total purchase price of $432,920. These engines have been in storage at Pier 72 for more than two years.[9] The engines were purchased for the purpose of refitting or repowering 20 MAN articulated buses in order to provide a reserve of buses for eight years after the remaining 80 MAN coaches are retired with the arrival of replacements in 1998 and 1999. Repowering specifications require the use of an installation "kit" which has added $95,277 to the $21,646 unit price for a total unit price of $116,923 or $2,338,460 for the 20 engines in question.

We have been advised that MUNI staff had originally underestimated the cost of the kit when the engines were purchased. We have also been advised that other transit organizations, Chicago Transit Agency (CTA), Indianapolis Transit and San Diego Metropolitan Transit Development Board, have repowered MAN diesel buses with Detroit Diesel engines and have not recommended that other transit agencies do the same.

CTA reports that their only Detroit Diesel refit has been extremely problematic, primarily because of enormous changes in the chassis and structure required to install the engine. Indianapolis repowered 10 MAN coaches with Detroit Diesel engines at more than $100,000 per coach, but stopped further conversions because they could no longer justify the expense. Further, their maintenance costs for these vehicles have become the highest in their fleet, so they are driven less than 3,000 miles per year. San Diego spent $100,000 to repower one MAN diesel bus with mixed results. They decided not to spend additional funds because they could not justify the cost.

An alternative to the repowering of 20 MAN buses with Detroit Diesel engines would be to rebuild the existing MAN engines to 1991 emission standards, install new Allison transmissions and upgrade the cooling system. The alternative would include the reselling of the Detroit Diesel engines at an estimated 65 cents on the dollar.[10] The alternative would save an estimated $1.1 million as follows:

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[9] The Department advised us on July 2 that a decision has been made to repower the 20 MAN articulated diesel buses using the Detroit Diesel Engines. Although this decision has already been made, we believe this is further evidence that the Department needs to fully evaluate its options before such costly decisions are implemented.

Table 2.4.5

A Comparison of Alternative Proposals Repowering/Rebuilding 20 MAN Diesel Buses

Description		Cost/Savings
Cost of Repowering with Detroit Diesel Engines		
20 Detroit Diesel Engines	$432,920	
20 Installation Kits	1,905,540	
Total Cost		$2,338,460
Less:		
Cost of Rebuilding 20 MAN Engines/Sale of 20 Detroit Diesel Engines		
In-house MAN Engines Rebuild	400,000	
New Allison transmissions	432,600	
Removing and replacing modules	50,000	
Subsequent added cost of rebuilding	200,000	
Loss in Selling Purchased Diesel Engines	151,520	
Total Cost		1,234,120
Estimated Savings		$1,104,340

Conclusions

MUNI currently has 24,350 vehicle parts valued at approximately $23.5 million which are stored at nine different maintenance locations in the City.

MUNI needs to implement stricter security measures that will protect their assets and/or mistakes in recording inventoried parts. Although MUNI has requested seven additional parts storekeepers, three would be sufficient to facilitate expanded maintenance swing and weekend shifts. Further, Materials Management staff should review current practices to identify more competitive prices or alternatives to fabricate parts in-house.

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[10] This amount is based on information provided by Materials Management. More recently, the Maintenance Division has advised that the reselling of the engines would provide only a resale value as scrap or an estimated 30 cents on the dollar, and thus MUNI would save an estimated $950,000 instead of $1.1 million. However, the Department was unable to provide us with any evidence that this lower value is all that could be obtained.

For example, A review of the existing wheel chair lift overhaul operations found that repairs could be done at less cost either by purchasing cheaper parts or by fabricating parts in-house. Potential savings with the overhaul and repair of 280 wheel chair lifts continues to be under investigation by the Maintenance Division.

In addition, 20 new diesel engines were purchased over two years ago, but never installed. Because the total cost may exceed $2.3 million, the Department of Public Transportation should consider selling the engines and implementing an alternate program of engine repair that should save an estimated $1.1 million.

Recommendations

The Public Transportation Department should:

2.4.1 Expand data collection on parts to include information on all purchases and parts that are fabricated by MUNI personnel;

2.4.2 Research other computer based materials inventory systems that will require less labor intensive data entry requirements than the current MMS and provide easier access and integration of all parts information with data maintained for the repair and maintenance of transit vehicles;

2.4.3 Introduce bar coding of parts into an improved materials inventory system in order to facilitate the tracking of information on the repair of individual transit vehicles;

2.4.4 Implement tighter security measures for parts storeroom access in order to control unauthorized entries by non-storeroom personnel;

2.4.5 Increase the number of hours that parts storerooms are open for the issuing of parts to maintenance personnel. We have recommended an additional three parts storekeeping positions so that storerooms are open between 6 a.m. and 7 p.m. on weekdays and between 8 a.m. and 5 p.m. on weekends. These expanded hours should facilitate the additional needs associated with the expanded maintenance hours.

2.4.6 Entries to the storeroom during times when parts storekeepers are not on duty should be limited to and be the responsibility of the night and weekend supervisors.

2.4.7 Provide for continuous review of existing vendor contracts to assure that MUNI is obtaining the best prices and if other opportunities such as in-house fabrication of parts might be a more economical alternative.

The Mayor should:

2.4.8 Direct the Purchaser to relocate five MUNI dedicated purchasing staff to MUNI's Materials Management centralized operation at Pier 80. This would comply with the recently passed Proposition M, which mandated the separation of MUNI functions from the Public Utilities Commission.

Costs and Benefits

Increased parts storeroom security and adherence to storeroom procedures will decrease the risk of the loss of assets and mistakes in the proper recording of parts issued and received.

The adding of parts storekeepers will provide swing shift and weekend hours that parts can be issued to maintenance personnel. Our recommendation of three additional parts storekeepers would reduce MUNI cost to hire seven additional parts storekeepers by $178,370.

The review of current vendor contracts would provide for opportunities that would result in savings. Two examples noted in this section identified potential savings with the overhaul and repair of wheel chair lifts and an estimated $1.1 million with an alternate proposal to repower 20 MAN diesel buses.

2.5 Farebox Revenue Collection & Control

- **Fifty-two percent of the incidents written up in the Revenue Division's "Unusual Occurrence" reports relate to situations where staff did not follow procedures or procedures were obsolete. By making procedural, operational, and physical work environment improvements, MUNI could increase productivity and accountability of staff in this division.**

- **For example, MUNI is foregoing approximately $36,860 annually in unearned interest as a result of being, on average, three days behind processing and depositing fare revenue. This is in violation of City Charter Section 6.311 that mandates all moneys and checks received by any officer or employee of the City and County shall be paid or delivered into the treasury not later than the next business day after its receipt. Furthermore, the late deposit of revenue, which is in the form of currency, jeopardizes the safety of City employees and the security of the revenue.**

- **The 15-year-old equipment for collecting revenue from subway faregates is technically inefficient, outdated, and costly to repair. Electronic fareboxes manufactured by Cubic Precision, a system that cost MUNI approximately $5.2 million to purchase and install in 1991, do not receive the required preventive maintenance, causing MUNI to forego revenue as well as incur excessive depreciation costs. Because of this faulty equipment, revenue and staff are placed at risk during the collection process.**

This section of the report examines the collection, receipt and deposit of MUNI's fare revenue by reviewing the operations and procedures of the units involved in these functions, including the Field Collection, Processing and Reconciliation Units of the Revenue Division.

The purpose of this section is to:

- Examine the general procedures of this division, focusing on revenue processing procedures and recommendations to improve upon current operations;

- Identify revenue equipment that could potentially be a risk to the overall collection process; and,
- Review MUNI's current transfer fare policy and discuss the Proof of Payment (POP) and the TransLink Project, which both may integrate with MUNI's current transfer fare policy.

The findings and recommendations in this section are based on observations of revenue collection and processing, and reconciliation operations; a review of many documents related to the revenue function; and discussions with unit supervisors, the revenue manager, the City Treasurer's Office, and outside transit operators.

Organization of the Revenue Collections Division

The Revenue Collections Division contains the following units: the Field Collections Unit, the Processing Unit, the Reconciliation Unit, and the Public Relations and Administration Unit with a total of 67 staff.

The mission of this division is to provide timely collection and processing of approximately $91 million annually in MUNI fare revenue; to provide timely processing of approximately $13 million annually in parking meter revenue under contract with the Parking and Traffic Commission (PTC); to distribute and collect monthly fast passes and tokens from various vendors; and to provide required sales staff at the War Memorial, Presidio, Powell/Market Koban, and Victorian Park vendor locations.

Of the $91 million in annual fare revenue, 79 percent, or approximately $72 million of fare revenues are collected from cash fares. Twenty-one percent of fare revenues are collected from advance fares.

Development and Enforcement of Procedures

General procedures manuals for the Municipal Railway's Revenue Division, including the Collection, Reconciliation, and Processing Units, have not been updated in the last 10 years.[1]

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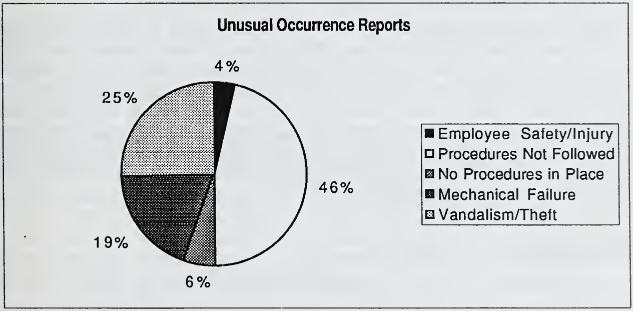
[1] The Municipal Railway's revenue collection system has not been audited for over five years, with the exception of the Cable Car revenue collection system in January 1994 (updated in October 1994) by the Controller. Other than this formal audit, some limited testing has been performed as part of the single audit of federal grants.

Current procedures are incomplete and some are obsolete. Accordingly, 52 percent of the incidents written up in this division's "Unusual Occurrence" reports relate to situations where staff did not follow procedures, or to incidents when procedures were obsolete. In some cases, when procedures do exist and are either formally or informally communicated to staff, enforcement by management and supervisors could be strengthened.

A total of 106 reports were collected from the above-mentioned units and the supervisors from these units described the types of events that were recorded in these reports. From the information provided by MUNI staff and an examination of these reports, the following categories were developed: (1) employee safety/injury; (2) procedures not followed; (3) obsolete procedures; (4) mechanical failure; and, (5) vandalism/theft. The distribution of causes for unusual occurrences by these categories is provided in the chart below:

Exhibit 2.5.1

Distribution of Causes for Unusual Occurrences
San Francisco Municipal Railway Revenue Division - FY 1995-96



In this analysis, procedures are considered to be an established course of action that are to be followed by those individuals who are responsible for carrying out particular duties. Examples of occurrences written in these reports include:

- Procedures Not Followed

  On March 9, 1996, an employee did not record the appropriate revenue processing information regarding coins collected in a specific subway canister. Subsequently, without this information, total collected revenue could not be accurately reconciled.

- Obsolete Procedures

  On June 3, 1995, the Revenue Division was overstaffed at the Victorian Park vendor location because, at the time, there was not a sufficient system in place to communicate and account for changes in the staff schedule.

The management of the Revenue Division should revise procedures manuals, effectively communicate changes in procedures, and enforce established procedures to ensure greater efficiency and effectiveness by the employees of the Revenue Division.

Cable Car Pass Collections

MUNI also has not established adequate procedures for staff to safely retrieve and transport revenue from Cable Car pass collection sites to headquarters. Specifically, during the P.M. pickup of revenue at the Powell/Market location, Division staff and a contract security guard are required to carry revenue from the ticket booth to the transport vehicle, which is often parked one to two blocks away from the booth. MUNI does not have a permanent parking spot designated in that location, often forcing staff to park blocks away. (MUNI has even been cited and towed by the City for parking the revenue van on Market Street when retrieving revenue). This situation puts personnel and revenue at risk.

Staff Productivity

Three fundamental functions of MUNI's Revenue Division include (1) the collection of fare revenue every day except Saturday by the Field Collections Unit, 2) daily sorting and processing of revenue by the Processing Unit, and (3) reconciliation of revenue deposits from vendors, counter sales, and fare revenue by the Reconciliation Unit.

Overall, these units sufficiently perform their duties and effectively coordinate their functions with one another, given their work schedules, the lack of standards, some of the working conditions, and problems with revenue collection equipment. These issues will be further addressed in this subsection.

Work Schedules

On average, MUNI is currently three days behind, and as many as six days behind in processing and depositing revenue as a result of obsolete processing standards, inadequate working conditions and high staff absenteeism. As a result, MUNI is foregoing approximately $36,860 in unearned interest annually.

This unit processes cash revenue from 5:00 A.M. to 1:00 P.M. daily. However, a day's worth of revenue is typically vaulted at MUNI as a result of its scheduled revenue pick-up time with Loomis, who is contracted with MUNI to deliver the revenue to Brinks, Incorporated, which is located in the City of Oakland. According to MUNI's Processing Supervisor, the revenue that has been processed on a given day can not be picked up on that day because Loomis must deliver the revenue to Brinks by 3:00 P.M. This schedule does not allow sufficient time if the unit runs over its scheduled 1:00 P.M. finishing time and/or if Loomis is to encounter traffic during its trip to the East Bay. MUNI should investigate the efficiency of changing the collection and processing schedules so that revenue collected the night before can be deposited the following day. For example, revenue is delivered to the Revenue Division vaults during the late evening and early morning hours, well before the scheduled Processing Unit start time of 5:00 A.M. If the Unit were to begin work four hours earlier than the current start time, the revenue collected from the previous day could be delivered to Oakland well before the 3:00 P.M. deadline established by Brinks.

Processing Standards and Availability of Staff

As part of revenue processing procedures, staff are required to unfold and sort a daily average of $95,000 in currency ($67,000 in one-dollar bills) before the currency can be counted electronically. According to a Processing Supervisor, it takes one fare collections receiver approximately one hour to unfold and sort $2,000 in currency. Therefore, nine fare collection receivers, which are scheduled to work a majority of the time (Tuesday through Sunday), must work approximately 5.3 hours to unfold and sort the daily average of revenue. The Processing Unit has a total staff of 11 fare collection receivers to process MUNI revenue.

However, MUNI is contracted with PTC to process revenue from parking meters, which requires two staff to dedicate four hours each to process this revenue (in the form of coins) for PTC on a daily basis—the equivalent of one full-time worker. Accordingly, when this unit is short-staffed, the processing of MUNI's revenue becomes secondary because MUNI management appropriately believes the Unit must meet the contractual obligation to PTC before accomplishing its own workload. As reported by MUNI management, the Department has purchased two new coin sorters to improve the productivity of the Unit.

Although MUNI has established estimates for individual productivity, the Revenue Division has not consistently implemented this standard as a mechanism to evaluate an individual's productivity. Neither is this standard used as a performance measure during an individual's yearly evaluation. The Unit's supervisor explains that the lack of enforcement occurs because staff are able to bid for the assignment to the Processing Unit, and tend to rotate duties every six months. Therefore, the unit is constantly training staff to perform these duties. Accordingly, it would not be appropriate to apply standards to trainees. Instead, productivity estimates are used primarily as guidelines and targets for employees to achieve.

According to a representative of the American Public Transportation Association's (APTA) Fare Collection Committee, and an employee of Houston's Metropolitan Transit Authority of Harris County Texas, many other transit operators have implemented and enforce a performance standard for processing currency. In addition, this representative states that productivity increases when individuals are assigned a specific batch of currency to sort. For example, this representative states that both the City of Atlanta's Metropolitan Atlanta Transit Authority (MARTA) and the Dallas Area Rapid Transit (DART), which both utilize electronic fareboxes similar to MUNI's, allocate one mobile safe per staff person to process.

Currently, MUNI processes currency from the electronic fareboxes one mobile vault at a time, and the currency from that vault is sorted by the entire team of fare collection receivers before the next vault is emptied. Accordingly, MUNI cannot easily establish expectations to measure productivity of its fare collection receiver staff.

The APTA representative suggests that allocating revenue sorting responsibilities as done by MARTA and DART, may require working space to be reconfigured in a manner that would allow for dividers to be constructed between staff, or cubicles to be installed in the work area.

For instance, DART's currency processors each have their own work stations (a 6x6 square foot cubicle that has an overhead security camera). DART's implemented processing standard is a minimum amount required per processor, and a representative from the agency states that most processors can sort 2,000 bills in an hour. The currency processing area used by DART is separated from the coin processing area in order to reduce excessive noise which emanates from the coin processing machines. The coin processing area is approximately 20x24 sq. ft.

A representative from the Chicago Transit Authority's (CTA) Treasury Vault Service states that the CTA has implemented a quota system for its currency processor that is based on a weekly average of 11,500 bills per day. The CTA has found that the weekly rate is more effective than a daily rate because processors work at different speeds throughout a day. This system enables processors to pace themselves throughout the week, and eliminates the pressures of accomplishing daily quotas.

With a full staff of nine fare collection receivers, MUNI's Processing Unit should be able to process both MUNI and PTC revenue. However, this unit has a high absenteeism rate. During January of 1996, this unit only had full staff 42 percent of the time. During a three month period from January 1996 through March 1996, approximately half of the staff in this unit worked less than 90 percent of their scheduled work hours.

A contributing factor toward high absenteeism could be the working conditions faced by the employees of this Unit, and inadequate space to perform their duties. The processing area is approximately 12x7 linear feet (84 square feet), and the fare collection receivers are required to sit side by side at one large table with very little room to perform their duties. Other transit operators and companies that process currency have established similar processing procedures as MUNI. However, the amount of space dedicated to sorting currency is usually greater for each of the employees working in the area, as illustrated in the table below.

Table 2.5.1

Comparison of Currency Processing Standards & Work Space Surveyed U.S. Transit Properties Compared with MUNI - 1996

Transit Operator	Processing Standard	Number of Processors	Square Feet of Work Space Dedicated Per Worker
Houston	1,700 bills/hour	5.5	40.9
Dallas	1,600 bills/hour	3.5	36.0
Chicago	1,533 bills/hour	24.0	33.0
San Francisco	None	9.0	10.0

For instance, Houston's transit operator dedicates a 15x15 foot area with 5.5 staff processing currency, for an average employee allocation of 40.9 square feet. Brinks dedicates a 12x18 foot area with 8 people processing currency, for an average employee allocation of 27 square feet. As can be seen in the table above, MUNI currently allocates only ten square feet per employee. Although the APTA representative stated that high absenteeism is common among staff who process currency and coins, he also believes that it is imperative to provide adequate space and conditions for staff to perform their functions if absenteeism is to be controlled.

In addition, according to MUNI's Health and Safety Inspector, the work area used for revenue processing violates fire, building, and CAL-OSHA codes. Two problems that need immediate resolution are updating the electrical and ventilation systems, and providing an accessible fire exit in case of power failure.

In order to correct these deficiencies, the unit and its functions would need to be relocated for six to eight months. MUNI is currently investigating temporary space and the necessary funds to temporarily relocate this unit. However, given the grossly inadequate area and design of the space, MUNI should instead consider a permanent relocation or renovation and expansion of this Unit's current work space that would be designed to fit the Department and PTC's needs.

Space usage and the feasibility of developing individual work stations should be fully evaluated by the Department, in conjunction with establishing performance standards. Within the constraints of Civil Service rules, MUNI should also adopt personnel incentives to improve productivity. For instance, MUNI could provide some form of recognition for employees who consistently meet the established performance standards during a three-month period.

Another option for MUNI would be to contract-out for the processing of revenue. For instance, the revenue manager at BART states that BART has previously looked at providing this service to other transit operators, and would be interested in discussing this potential opportunity with MUNI. In addition, MUNI should also investigate contracting with Brinks, Inc., who submitted an unsolicited proposal to perform these services for MUNI in 1994.

Revenue Collection Equipment

By observing the collection of revenue from subway faregates at Embarcadero, Montgomery, Powell, Civic Center, Van Ness, Church, Castro, Forest Hill, and West Portal stations, as well as the collection of revenue from BART-MUNI ticket machines at BART Stations in San Francisco, we determined that the faulty, outdated equipment used to collect subway revenue creates security risks to personnel and revenue, requiring staff to use makeshift procedures to collect revenue. During the observation of the revenue collection, it was noted that the field collection staff competently carried out their responsibilities and duties given the faulty and outdated equipment they are required to work with. The following observations illustrate the conditions under which staff are required to perform their duties:

- At the Embarcadero Station, staff were observed lining the bottom of the flasher unit (mobile repository that holds revenue containers) with a cloth bag in order for the extractable grant vault to fit properly into the flasher unit.
- At the Montgomery Station, a piece of cardboard was wedged between a faregate and the metal bar-lock, ensuring that the faregate door remains

completely closed and that the revenue canister is flush against the faregate so that the internal microprocessor will read the revenue. This observation indicates that faulty equipment is used to collect revenue and does not indicate, in this particular situation, a risk to the security of the revenue or to the staff.

- At the Civic Center Station, staff were observed using a crowbar to pry a grant vault out of a flasher unit. Old grant vaults are welded together to collect and temporarily store revenue.
- There are not enough usable grant vaults to collect all the revenue from each faregate. Staff were observed using a cloth revenue bag to collect the revenue out of faregates that have the least amount of revenue (Forest Hill Station). Staff handle revenue directly in this situation. Thus, there is minimal control over the receipt and security of cash in the stations when this occurs.

A survey of the subway revenue collection equipment revealed that there are sufficient numbers of grant vaults to temporarily transport collected revenue. However, this equipment undergoes constant maintenance and frequent modification by the Electronics Shop in order for MUNI to utilize and properly secure revenue.

In April 1996, the MUNI Field Collection Unit's inventory of subway equipment was short seven grant vaults, which are used to temporarily store and transport revenue. According to staff from MUNI's Electronics Shop, the Electronics Shop is holding eleven grant vaults that were recently modified to become more technically efficient. However, the modified grant vaults are awaiting new locks, which are on order. Until these locks are installed, the grant vaults cannot be used.

In addition, it is costly to order new equipment from the manufacturer since the equipment is not longer regularly produced. For example, MUNI must pay $829 to replace a revenue canister for a system that requires 54 operating canisters. Furthermore, if new equipment is ordered, it takes the manufacturer six to 12 months to fill the order. MUNI has replaced approximately half of the number of canisters (approximately 28) over the last three years. According to MUNI management, the Department installed locks on the subway faregates in 1994, which has significantly reduced the number of canisters that are replaced as a result of theft or vandalism.

Electronic Fareboxes

The electronic farebox system cost MUNI approximately $5.2 million to purchase and install in 1991, and this system is relied upon to collect 71 percent of MUNI's total daily fare revenue of approximately $245,000. Approximately 1,131 electronic fareboxes are used to collect revenue on diesel buses, trolley buses and articulated buses (based on an average A.M. pull-out of 862 buses). Eleven technicians provide maintenance on these fareboxes, responding to approximately 480 road calls a month for electronic farebox break-downs during service.

Currently, MUNI conducts preventive maintenance on fareboxes every 90 days rather than every 30 days, as recommended by transportation consultants involved in the purchase of the system. Because MUNI's electronic farebox equipment does not receive recommended preventive maintenance, it is probable that road calls are higher than necessary.

For example, according to the Vice Chair of APTA's Fare Collection Committee, and an employee of the Houston's Metropolitan Transit Authority of Harris County, Texas, preventive maintenance on fareboxes is important. Houston utilizes 1,300 electronic fareboxes (based on a pull-out of 850 buses) which are serviced by 16 technicians, who also provide regular preventive maintenance on the equipment. Houston reportedly receives 350 road calls a month.

When compared with Houston, MUNI responds to 21 percent more road calls for farebox break-downs than does Houston. MUNI's staff which is dedicated to farebox maintenance is also 31.3 percent less than Houston's, which suggests that the added preventive maintenance provided by Houston personnel may contribute to lower rates of equipment breakdown. Because MUNI also experiences greater ridership than the Houston property, and thus receives more wear on its fareboxes, it is reasonable to assume that an expanded preventive maintenance program at MUNI would be a critical element in reducing service interruptions because of failed farebox equipment.

A consultants report on MUNI's farebox system maintenance,[2] states that preventive maintenance needs to be scheduled and performed so that every farebox, cashbox, receiver and mobile vault will receive preventive maintenance once a month. MUNI's electronic shop, which is also responsible for maintaining the revenue collection equipment for the subway system, currently staffs a total of 11 people whereas this report recommends that 21 people are required to maintain this system. The APTA representative confirms that the recommended preventive maintenance schedule of every 30 days is an adequate standard.

The risks associated with untimely electronic farebox preventive maintenance are the following:

- Lost revenue from malfunctioning fareboxes;
- Excessive depreciation of farebox equipment;

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[2] J.W. Leas & Associates, "Farebox Collection System Maintenance," August, 1991.

- Reduction in the number of vehicles in service when fareboxes break down;
- Additional staff costs due to increases in road calls;
- Additional travel time required for responding to increases in road calls; and,
- Negative public opinion developed from continuously malfunctioning fareboxes

These risks are significant because they affect both service quality and reliability, and farebox recovery. The Director of Public Transportation should evaluate staffing needs based on previous consultant recommendations and the experience of other jurisdictions, and submit a request for funding to the Public Transportation Commission, Mayor, and Board of Supervisors. An increase in staff by six positions, which is approximately half of the new positions recommended by the consultant, would increase MUNI's costs by $398,681 per year for a total staff of 17.

Fare Policies

The City's fare policies will have significant impact on decisions related to procedures, equipment purchases, and staffing of MUNI's fare collection system. The City is currently testing a Proof of Payment system and investigating the integration of TransLink, a regional fare system which will allow patrons to purchase inter jurisdictional passes.

Transfer Fare Policy

The Municipal Railway has always used a transfer fare system.[3] MUNI provides a single flat rate fare for all passengers, with discounts for seniors and youth. MUNI also offers discounts with the purchase of monthly and weekly Fast Passes and tokens. Zonal pricing, length of travel time, distance traveled, time of day of travel, and day of travel are not used as a criteria to formulate MUNI's fare structure. However, MUNI has various transfer agreements with other transit operators designed to facilitate regional travel by providing a coordinated fare structure.

In FY 1993-94, passenger fare revenue was MUNI's single largest revenue source, accounting for 38 percent of total revenues.

MUNI's transit fares are structured to accomplish the following objectives:

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[3] In July 1993, the Board of Supervisors approved a revised fare schedule for MUNI that left the base adult fare at $1.00, but increased all other cash and pass prices. The Board also eliminated transfers and replaced them with a new day pass and week pass. After a brief trial period, transfers were reinstated in March of 1994.

- To generate revenues which are sufficient to provide convenient, effective, safe, and efficient transportation services to meet the needs of all San Francisco residents and visitors.
- To provide equitable and efficient transit service as an effective alternative to the automobile, and thereby reduce traffic congestion, energy consumption, air pollution, and parking problems.
- To provide reasonable discounts to youths, seniors, and disabled persons.

The current fare policy is a sound one. However, with changes in technology and in an effort to control operating costs, MUNI has been examining fare policies and systems which are used by other operators, or are part of a regional effort to provide more of a seamless transit system throughout the Bay Area. Integration of these fare policies could impact the manner and extent to which MUNI will collect and process fares.

Proof of Payment (POP)

MUNI has partially implemented and is currently testing the functionality of the Proof of Payment system on the LRVs. With this system, passengers with proof of payment (monthly pass or transfer/fare receipt) in their possession could enter any Metro car at any door. Passengers needing to pay a cash fare would enter at the front door of the lead car. Operators would issue each paying passenger a fare receipt, valid for a specified length of time. Fare receipts would also be issued at subway turnstiles. Fare inspectors would be deployed randomly on all Metro cars to enforce fare policies. Passengers with no proof of payment would be subject to a fine in the range of $20 to $25 or more.

According to MUNI's Short-Range Transit Plan (SRTP, October 1995) implementation of a POP system could enable service capacity per employee to become more efficient by eliminating the need for an operator in each car; shorten dwell times due to all-door boarding; improve passenger comfort due to better load distribution with cars; enhance system security due to the presence of a roving fare inspector; and increase passenger convenience due to reduced overall travel times.

If implemented throughout the LRV system, the POP program could impact the operations of the Revenue Division by changing the mix of station and farebox collection systems, and the amount of cash revenue to be counted.

TransLink

TransLink is a regional project that would improve passengers' ability to transfer between various transit systems in the Bay Area. This system would allow for: (1)

inter-operator transfers using a TransLink ticket; (2) provide a widely available substitute for cash and tokens; (3) reduce the number of fare instruments used on MUNI; and (4) reduce cash handling.

According to the Department's Capital Improvement Program (October 1995), MUNI staff has developed a series of options for implementing TransLink on the MUNI system. These options will be presented to the Public Transportation Commission (PTC) for policy direction. All options would provide for inter-operator transfers using TransLink ticket readers at fare gates or in station areas, and on board buses and light-rail vehicles. MUNI is currently examining the following matters in relation to TransLink:

- MUNI's role with debit cards;
- Potential equipment maintenance problems;
- Funding sources for implementing and operating TransLink; and,
- Interfacing TransLink with current MUNI transit fare systems.

Cost estimates for various options have been made, but they are preliminary and assume the use of existing TransLink magnetic strip technology. The estimated total project capital cost is approximately $29.4 million, according to the Capital Improvement Program, with proposed federal funding of $24.3 million, proposed state funding of $2.2 million, and a proposed local match of $2.8 million.

If TransLink receives approval from the Public Transportation Commission (PTC), the system would supplement the current revenue collection systems, as well as interface with the Proof of Payment system that is currently being tested by MUNI. In order to implement TransLink, the subway faregates would need to be retrofitted to interface with both Subway fares and TransLink. According to MUNI's Revenue Manager, MTC may cover the cost of retrofitting the subway faregates.

The current subway revenue collection system has a life span of 20 years, and is currently in its 16th year. Presently, the Revenue Collection staff uses makeshift procedures to collect revenue out of the faregates because the machinery is costly to replace and requires labor-intensive repair modifications. MUNI should coordinate its current examination of TransLink with future subway equipment procurement.

Conclusions

Fifty-two percent of the incidents written-up in the Revenue Division's "Unusual Occurrence" reports relate to situations where staff did not follow procedures or procedures were obsolete. By making procedural, operational, and physical work environment improvements, MUNI could increase productivity and accountability of staff in this division.

For example, MUNI is foregoing approximately $36,860 annually in unearned interest as a result of being, on average, three days behind processing and depositing fare revenue. This is in violation of City Charter Section 6.311 that mandates all moneys and checks received by any officer or employee of the City and County shall be paid or delivered into the treasury not later than the next business day after its receipt. Furthermore, the late deposit of revenue, which is in the form of currency, jeopardizes the safety of City employees and the security of the revenue.

The 15-year-old equipment for collecting revenue from subway faregates is technically inefficient, outdated, and costly to repair. Electronic fareboxes manufactured by Cubic Precision, a system that cost MUNI approximately $5.2 million to purchase and install in 1991, do not receive the required preventive maintenance, causing MUNI to forego revenue as well as incur excessive depreciation costs. Because of this faulty equipment, revenue and staff are placed at risk during the collection process.

Recommendations

The Director of Public Transportation should direct the Director of Enterprise Accounting to:

2.5.1 Update and distribute procedure manuals to indicate current operating procedures by October 1996, which would result in increased efficiency, effectiveness, and security over farebox revenues;

2.5.2 Develop alternative collection and processing schedules so that revenue can be deposited within one day, as required by the City's Administrative Code.

2.5.3 Develop and implement a performance standard by which to evaluate the productivity of fare collection receivers by October 1996;

2.5.4 Develop program incentives which will increase productivity and morale, and which comply with Civil Service rules, for staff to meet performance standards;

2.5.5 Complete structural improvements of Processing Unit's area by December 1996, which will ensure the safety of staff;

2.5.6 Coordinate with the Maintenance Division to establish an appropriate preventive maintenance schedule for electronic fareboxes;

2.5.7 Work with the Department of Parking & Traffic to establish a designated parking area for MUNI's revenue collection unit near the Market/Powell cable car turnaround by October 1996;

2.5.8 Develop a staffing plan which will ensure the timely and secure processing of farebox revenue;

2.5.9 Investigate contracting out for revenue processing services with Brinks, Inc., and BART, and report back to the Transportation Commission on its feasibility and comparison to in-house staffing costs by January 1997;

2.5.10 If the program is to be retained in-house, evaluate the space needs of the processing unit, and investigate the feasibility of developing individual work stations; and,

2.5.11 Coordinate the current examination of the TransLink Project and the issues of concern to MUNI in relation to this project, with the potential procurement of subway fare collection equipment.

Costs and Benefits

The costs for implementing potential staffing, contracting, and structural improvement alternatives cannot be estimated at this time. Other recommendations could be implemented by the Department at no cost.

Implementation of these recommendations would result in increased efficiency and productivity within MUNI's Revenue Collection Unit. In addition, the security of the staff and revenue would no longer be in jeopardy when procedures are established or updated. MUNI will earn an estimated $36,860 from annual interest income when it begins to comply with the City's Charter provisions and deposits the revenue by the day after it is collected.

3. Selling Surplus Assets

Proposition J requires that the Budget Analyst examine MUNI's potential for selling surplus assets. For purposes of this report, surplus assets include real property owned and used by the Municipal Railway. This includes all of the diesel, trolley, light rail, cable car, electrical substation yards, and administrative facilities.

A review of the current use of these facilities and properties indicate that none are presently considered surplus to the Municipal Railway. All facilities are used beyond capacity, and with the addition of new vehicles to all modes of operations during the next decade, the current use will increase.

Accordingly, we evaluated the Department's efforts to identify and obtain alternative facilities which will better meet the Department's needs, and result in potential surplus property. Once the Department identifies properties which may be appropriate for surplus designation, we review the major issues which must be explored and considered by MUNI management before recommendations on the sale or development of properties can be developed.

Thus, this section of the report includes two findings:

(1) Facility Planning; and,
(2) Disposition of Surplus Assets.

They are described more fully on the following pages.

3.1: Facility Planning

- **MUNI vehicle maintenance and storage facilities are at or above capacity. Construction of new facilities or expansion of existing facilities has been deferred by MUNI until after the year 2005 because anticipated federal, State and local funds have been allocated to replacing the entire fleet of LRV, trolley and diesel vehicles, as well as to major capital expansions such as the F-Line. However, MUNI and funding agencies must recognize that MUNI's ability to protect its investments in new vehicles will be jeopardized by relying on inadequate maintenance and storage facilities.**

- **Major decisions on objectives, priorities and sites must be made before MUNI can effectively pursue funding for facilities projects. The Deputy Directors for Maintenance and Capital Projects should develop a two-year program, with suitable milestones, for creating a Facilities Master Plan. MUNI should move aggressively towards applying for funds to complete key facilities projects as soon as possible, to ensure that riders receive the maximum benefits from the new vehicles being purchased.**

MUNI occupies facilities throughout the City for (1) maintenance and storage of vehicles, (2) operational functions such as turnarounds and power supply substations, and (3) administrative offices. MUNI owns most of this space (occupying land area of approximately 56 acres), and leases another 177,000 square feet of space. The Capital Improvement Program (CIP) assumes funding on an annual basis for minor fixed facility improvements, to maintain these facilities as functioning parts of the MUNI system. Changes and growth to MUNI's fleets and service patterns have created the need for several major facility renovations and/or replacements. Relatedly, certain MUNI properties have outlived their usefulness, so that when they can be replaced, MUNI will be able to dispose of or develop surplus properties. However, for reasons that will be explained below, major facility projects have generally been deferred until after the current ten-year CIP period ends in 2004.

This section of the report examines the quality of MUNI's maintenance/vehicle storage facilities, which play a crucial role in determining how efficiently the Maintenance and Operations Divisions perform their jobs. We also examine shortcomings of MUNI's administrative office space. In this context, the next section (Section 3.2) will review opportunities for improvements that include the disposition of potential surplus space.

This section of our report does the following:

- Reviews the CIP prioritization process as it relates to facility projects.
- Outlines maintenance/vehicle storage and administrative facility shortcomings, and related renovation/replacement projects that have been identified by MUNI.
- Recommends the immediate development of a Facilities Master Plan to further prioritize facility needs and help MUNI to pursue earlier funding for key projects.

Our findings and recommendations in this section are based on review of MUNI's SRTP and CIP, site visits to maintenance and administrative facilities, and discussions with site supervisors, division directors and funding agency staff.

Capital Project Prioritization

At the urging of funding agencies, MUNI's most recent CIP (1995-2005) prioritizes all capital improvement projects and specifies those projects that are expected to be funded during the ten year planning period. Such a prioritization exercise was important because MUNI clearly had defined more projects than could be funded or implemented during the time period. The CIP grouped projects into broad categories, and ranked them within each category, and then ranked the categories in priority order. The current CIP ranks project categories in the following order:

1. Legally Required Projects
2. Substantially Completed Projects
3. Special Circumstances Projects
4. Sustain Service - Fleet
5. Sustain Service - Infrastructure
6. Service Equity/City Policy
7. Sustain Service - Facilities
8. Expansion/Improved Service

As shown above, major facilities projects are near the bottom of the ranking list, followed only by projects that would expand service. Even this placement is somewhat misleading, because various service expansion projects, such as the 71-Haight/Noriega electrification and development of the Bayshore Corridor project, are actually included in the "service equity/City policy" category that is ranked above facilities projects. MUNI does plan to request funding for federally mandated underground cleanup at the Woods Division, and paint and body functions at all facilities. In addition, renovation of the Green Division must be completed to accommodate the new LRVs. Only one other major facility project, replacement of the Ways & Structures facility with a new building at 700 Pennsylvania Street, has been placed in the "special circumstances" category and slated for completion during the ten year CIP period. The rest are shown as part of the CIP, but are not expected to receive funding until after 2005.

MUNI's fleet replacements will use more than half of the $1.34 billion in capital project funding that is projected in the CIP from 1995 through 2005. Because of the age and condition of the LRV, trolley and diesel fleets, these replacements must be carried out in this time period. This largely accounts for the lack of funds available for major facilities projects.

However, discussions with MUNI staff and funding agencies indicates that renovation and replacement of facilities tends to be considered last, at least in part because such projects are not visible to the public, regardless of their actual impact on the quality of service to the public. The MTC, which allocates most federal funds for transit capital projects, ranks facilities projects low. MUNI administrators report that the Transportation Authority, which distributes local transit sales tax funds, is also reluctant to fund facilities projects, although the Transportation Authority provided MUNI with $400,000 to develop a Facilities Master Plan in 1992. MUNI's ranking of capital project categories thus caters to funding agency biases against facility projects, placing "special circumstances" and "service equity/City policy" projects ahead of facilities projects designed to sustain service.

During 1996, with the approval of the Transportation Authority, MUNI administrators allocated the bulk of the $400,000 Facility Master Plan funding from the Transportation Authority to fund a Facility Assessment to be conducted by the Department of Public Works (DPW). The facility assessment is designed to provide a multi-year constrained plan for maintaining MUNI's existing facilities. The DPW study will evaluate the physical soundness of MUNI facilities. The assessment should provide a guide for MUNI to use in prioritizing the myriad of relatively minor fixed facility improvements that are needed on an ongoing basis to preserve the existing facilities until at least 2005. However, this study will not provide an in-depth analysis of the efficiency of such facilities in relation to maintenance and operational functions. Such an analysis is needed to lay the groundwork for a Facilities Master Plan.

The major shortcomings of MUNI's motor coach, trolley and LRV facilities are detailed below. A summary of deferred improvements to these facilities is shown in the chart that follows this page.

Exhibit 3.1.1

MUNI Maintenance & Staging Facilities
Deferred Improvements

Light Rail Vehicles

Green Center, Green Annex, Geneva Carhouse

- Will operate at "crush capacity" with fleet increase to 136 for MMT, MMX.
- Maintenance/storage logistics complicated by need to accommodate both Boeing and Breda vehicles.
- Existing facilities can not accommodate Bayshore Corridor expansion.

Deferred Projects:

- Metro East LRV Facility, to be located in Mission Bay, on 3rd Street, at Hunter's Point or at Breda assembly plant on Pier 80.

Trolley Cars

Potrero Division, Presidio Division

- Presidio Division has no maintenance bays for articulated trolleys, which will comprise 38 percent of the trolley fleet by 1999.
- Potrero Division renovation was poorly designed. Needs further renovation to correct problems with maintenance pits, lifts, coach washing equipment.

Deferred Projects:

- Reconstruction of Presidio Division, with or without joint development project.

Diesel Coaches

Woods, Kirkland, and Flynn Divisions

- All divisions operating at capacity.
- Buses cannot be staged efficiently at Kirkland or Woods, so cannot assign buses to particular drivers; tight parking can cause delays of multiple vehicles if one vehicle won't start.
- Kirkland located in congested area, so access is slow; can only handle light maintenance because of lack of space for repair operations.
- Flynn was designed for light repair but must handle all articulated diesel heavy repair. Also has inadequate ventilation.
- Woods fueling stations across street from parking area.

Deferred Projects:

- Islais Creek replacement of Kirkland Division.
- Woods Division renovation.

Multi-Modal

Deferred Project:

- Central maintenance or component repair facility and central warehouse facility

Motor Coach Maintenance/Storage Facilities

MUNI's four motor coach facilities, the Woods, Flynn, and Kirkland Divisions, are operating at capacity. The most inadequate of these facilities is the Kirkland Division, which is unable to sustain its required level of service because of facility constraints. Traffic congestion in this area is heavy, so buses lose time approaching and leaving the facility. There is not enough repair space to permit heavy maintenance, so only light maintenance is performed at Kirkland. Furthermore, buses cannot be staged efficiently. Tight parking in rows can cause delays of several buses if one bus will not start, and vehicles cannot consistently be assigned to particular drivers, because of the inflexibility of the staging area. This also requires additional yard staff to direct pull-in, which otherwise would not be needed.

The Woods Division shares some of the staging problems of the Kirkland Division. Also, fueling stations at the Woods Division are located across the street from the parking area, which creates logistical problems during servicing. Although the Woods Division can handle standard motor coach heavy repair, only the Flynn Division has adequate facilities to repair articulated motor coaches. The Flynn Division, however, is enclosed. It is not clear whether adequate ventilation is provided to prevent health hazards related to carbon monoxide.

Under MUNI's Capital Improvement Program, the Woods Division is to be renovated to correct various design and operational problems. This project has been deferred. Property at Islais Creek would, according to MUNI's SRTP, be used to replace the Kirkland Division. The Islais Creek property is currently being cleared, but actual development of a new facility is also deferred until after 2005. MUNI administrators have not determined definitively that the Islais Creek site will work as a replacement for the Kirkland Division; analysis and preliminary designs need to be prepared to determine whether the site is large enough and configured appropriately so that there would be enough space for improved vehicle parking and staging.

Trolley Coach Maintenance/Storage Facilities

MUNI's two trolley coach facilities, the Potrero and Presidio Divisions, each have serious flaws that impede maintenance activities. A major renovation of the Potrero Division was completed in 1992, chiefly to prepare the facility for the introduction of articulated trolley coaches. As detailed in Section 1.7, this renovation was poorly planned, with lack of attention to problems identified by maintenance supervisors. As a result, the Potrero Division needs further renovation to correct problems with maintenance pits, lifts and coach washing equipment.

The CIP states that the Presidio Division is overcrowded, lacks sufficient drive-through maintenance capability, and has no maintenance bays large enough for articulated trolleys. Although the site has expansion potential, MUNI has determined that demolition of the existing facility will be necessary to enable construction of a significantly better facility. The project is complicated by the fact that MUNI's administrative headquarters is located above the trolley coach facility. As will be discussed below, the headquarters is too small to meet MUNI's needs, but clearly the facility reconstruction must be coordinated with the relocation of the headquarters. This project has been deferred until after 2005.

Light Rail Vehicle Maintenance/Storage Facilities

All LRV maintenance and storage is located at two facilities that are across the street from each other: the Green Center (and Annex) and the Geneva Carhouse. MUNI's SRTP states that these facilities are at full capacity now, and will be at "crush capacity" with the addition of cars for the Muni Metro Turnback and the Muni Metro Extension. The CIP states that these facilities are "beyond their design capacity for vehicle storage and maintenance, thus causing certain functional inadequacies." Maintenance of LRVs will be further complicated by the need to accommodate both the Boeing and the Breda models. Maintenance officials advise that maintenance space is extremely constrained at these facilities, so that an unanticipated maintenance problem could create delays that would effect MUNI's ability to meet the scheduled level of LRV service.

Because the new Breda LRVs are longer and differently shaped than the Boeing LRVs, the Green and Geneva facilities are being modified to accommodate them. Such modifications could not be deferred, and funding has been obtained to implement them in 1996.

MUNI's CIP includes the Bayshore Corridor Project, which calls for installation of light rail service in the Bayshore area. A total of 20 more LRVs are expected to be required to service the Bayshore Corridor. Implementation of the Bayshore Corridor Project would have to be accompanied by acquisition of another LRV facility, which is generally referred to as Metro East in MUNI planning documents.

Although possible sites for a Metro East facility have been identified in the Mission Bay area, on 3rd Street and at Hunter's Point, the project has been delayed until completion of the Bayshore Corridor project, post 2005. Another alternative site, the Breda assembly plant at Pier 80, has not yet been thoroughly assessed. Breda built this plant at MUNI's request to facilitate local monitoring of the LRV manufacturing process. Staff in the Capital Projects and Maintenance Divisions report that the plant, which is located along the Bayshore Corridor, could potentially meet MUNI's needs for an additional LRV facility. However, it will be necessary to assess the cost of capital improvements that would be necessary to bring the site up to City labor standards.

Central Maintenance/Component Repair and Warehouse Facility

The Islais Creek property might also be used to establish a central maintenance facility, or, if administrators determine that decentralized basic maintenance is preferable, a component repair facility that would serve all divisions. In addition, a central warehouse facility is needed, according to Maintenance Division officials, because none of the existing maintenance facilities has adequate storage space. A central warehouse facility would also service the planned component repair facility, and would facilitate inventory control. Although Islais Creek has been identified as a potential site for such a facility, the site may not have adequate space to accommodate it, in which case an alternate site would have to be obtained. This project has been deferred until after 2005.

Administrative Office Facilities

Although MUNI officially has a headquarters located at 949 Presidio Avenue, in fact MUNI's administrative functions are dispersed between that location and leased space in the Downtown and Civic Center areas, as well as at the Green Division facility. MUNI pays a total of approximately $1.23 million per year in rent for office space. The inefficiency of this arrangement has been considered a problem by MUNI for several years. Senior staff involved in finance and strategic planning have to travel across busy sections of the City simply to sit down in a meeting together. The headquarters building on Presidio Avenue is located with one of the trolley divisions, but otherwise is geographically distant from most of MUNI's operational/maintenance facilities, which are clustered in the southeastern area of the City.

At the time that this study was prepared, MUNI was negotiating to lease additional office space in the Civic Center area, because the Water Department (SFWD) has asked MUNI to vacate office space in an SFWD building on Mason Street. Long range plans, however, call for the construction of a new headquarters building that could bring together the Public Transportation Commission staff, the General Manager's staff, the Finance and Administration Division staff, and the Operations Division management staff. MUNI's CIP states that six sites are under consideration for such a headquarters building: (1) the air rights above the planned new Transbay Transit Terminal; (2) Civic Center; (3) above the Woods Division, post rehabilitation; (4) Islais Creek; (5) with the planned Metro East LRV facility, for which a site has not been selected; and (6) with the Presidio Division, post rehabilitation.

MUNI administrators are divided on the issue of whether to locate a headquarters close to the southeastern section of the City (i.e., at the Transbay Transit Terminal site, the Woods Division, Islais Creek or Metro East), where many MUNI facilities are located, or to locate the headquarters in the Civic Center, to facilitate communication with City officials. Although MUNI has started to analyze the financial feasibility of developing the Transbay Transit Terminal site, the basic question of where to locate a new headquarters must be resolved by senior management and the Public Transportation Commission before the project can proceed. Furthermore, interviews with various MUNI administrators revealed that there is no clear plan that specifies exactly which functions and personnel should be consolidated in a new headquarters. This project is among the major facilities projects that has been deferred in the CIP.

Conclusions

MUNI vehicle maintenance and storage facilities are at or above capacity. Construction of new facilities or expansion of existing facilities has been deferred by MUNI until after 2005 because anticipated federal, State and local funds have been allocated to replacing the entire fleet of LRV, trolley and diesel vehicles, as well as to major capital expansions such as the F-Line, MMT, MMX and ATCS. However, MUNI and funding agencies must recognize that MUNI's ability to protect its investments in new vehicles will be jeopardized by reliance on inadequate maintenance and storage facilities. Implementation of certain facilities relocations would also enable MUNI to pursue potential revenue-generating development of MUNI property, as discussed in Section 3.2 of this report.

Major decisions on objectives, priorities and sites must be made before MUNI can effectively pursue funding for facilities projects. Among the key questions that must be resolved are the following:

- Will relocation of the Kirkland Division diesel bus facility to the Islais Creek site meet MUNI's needs for an improved maintenance and operations facility?
- Should MUNI pursue development of a central maintenance facility, or commit to decentralized basic maintenance, and develop a component repair facility?
- What other MUNI facilities should and could be located at Islais Creek? What is the optimum mix of uses for this site?
- Should the Presidio Division trolley facility be expanded at 949 Presidio, or relocated to facilitate revenue-generating development at this site? Are there potential sites for such a relocation?

- Where should the planned Metro East light rail vehicle facility be located? Depending upon the site selected, how soon will MUNI have to act to obtain the site?

- What specific functions and personnel should be located at a new administrative headquarters? What are their space needs?

- Where should a new administrative headquarters be located -- in the Civic Center near other government functions, or in the southeastern area of the City, near other MUNI facilities?

These are basic decisions, many of them interrelated, which must be made by senior management before MUNI can make any progress on major facilities improvements. The current lack of funding should not be used as an excuse to forestall making difficult decisions.

The Deputy Directors for Maintenance and Capital Projects should develop a two-year program, with suitable milestones, for creating a Facilities Master Plan. This program should include a decision-making structure that promotes input from all affected sections of the organization and establishes the accountability of senior management, as a group, for key components of the Plan. If necessary, MUNI should approach funding agencies, such as the Transportation Authority, for additional funds to support dedicated staff to coordinate the process. MUNI should move aggressively towards applying for funds to complete key facilities projects as soon as possible, to ensure that riders receive the maximum benefits from the new vehicles being purchased.

In summary, MUNI cannot afford to defer major facilities improvements indefinitely, without jeopardizing its multi-million dollar investments in new LRV, trolley and diesel fleets, and effecting service on the street. Development of a comprehensive Facility Master Plan over the next two years is a crucial first step towards obtaining the necessary funding for such projects at the earliest possible date.

Recommendations

The Director of Public Transportation should:

3.1.1 Develop a two-year program, with suitable milestones, for creating a Facilities Master Plan. This program should include: (1) an analysis of the relationship between facilities constraints and service delivery, to further prioritize facilities projects and improve funding agency understanding of their importance to protecting the investment in new vehicles; (2) a conceptual analysis of the desired structure for delivery of maintenance services, by mode; (3) an assessment of identified site alternatives for meeting the highest priority long range maintenance and operations goals related to facilities; and (4) alternative financing plans and delivery schedules. Milestones should be defined to highlight decision points for the Deputy Directors and the Director.

3.1.2 Dedicate adequate staff to coordinate the Facilities Master Plan project, if necessary, soliciting additional funds from the San Francisco Transportation Authority.

3.1.3 Move aggressively towards applying for federal, State, and local transportation funds to complete top priority facilities projects, as identified in the Master Plan, as early as possible (i.e. starting immediately in 2005, or earlier if unanticipated funding opportunities are found), to ensure that (1) the new fleets will be properly stored, maintained and operated; and (2) opportunities for optimal site selection will not be missed due to extensive delay.

Costs and Benefits

Implementation of the above recommendations will put MUNI in a strong position to access grant funding for major facilities projects at the earliest possible date. Key facilities improvements are needed to protect the property's investment in new light rail, trolley and diesel bus fleets.

3.2: Disposition of Surplus Assets

- **MUNI currently has no property which has been declared as surplus property, or property which is excess to the needs of MUNI. However, certain MUNI facilities do not serve MUNI well in their current locations. If the functions can be relocated to more appropriate sites, then the existing sites would become available for sale or development by MUNI. There are no funds programmed for such relocations in MUNI's 1995-2005 Short Range Transit Plan.**

- **The primary sites that present possible future revenue opportunities are: (1) the site of the Kirkland Division motor coach facility, in the Fisherman's Wharf area; (2) the 949 Presidio Avenue site, currently used as a trolley division and as MUNI's administrative headquarters; and (3) a parcel at the corner of Mission Street and Steuart Street, currently used as a layover lot for trolley and diesel bus lines. A preliminary assessment of the development potential of these sites has recently been conducted by a consultant. In addition, there may be opportunities for lease of ground or air rights surrounding MUNI substations.**

- **It is crucial that MUNI complete the Facilities Master Plan that is discussed in Section 3.1, to determine how each site fits into its long term operational framework. The need to provide fully functional maintenance, operations and administrative facilities for MUNI activities should take priority over real estate disposition strategies, although facilities plans and revenue-raising efforts may be compatible in some instances. Once MUNI's facility plans have been clearly defined, it will be necessary to obtain more detailed cost and market analyses of identified development options.**

Proposition J requires that we examine MUNI's plans for the selling of surplus assets. In fact, MUNI has not designated any property as surplus. However, certain properties could become surplus if MUNI carries out planned facilities changes. There is a direct connection between the disposition of surplus assets and MUNI's long term facilities strategy, because the opportunities for MUNI to profit from the sale or development of its property pertain to properties that are currently in use: the Kirkland Division, the 949 Presidio Headquarters, a site at Mission and Steuart Streets that is currently used as a terminal and layover lot for trolleys, and the air rights over MUNI substations. MUNI cannot proceed with the sale or development of these properties until the functions they currently house can be relocated to improved facilities.

In Section 3.1 we outlined the deficiencies of various MUNI facilities and the urgent need for a detailed Master Facilities Plan to guide MUNI when it pursues facilities improvements and replacements. That section described options for location of the Kirkland and Presidio Divisions, as well as the administrative headquarters. This section of the report examines the development potential of the existing sites of these facilities, as well as the Mission/Steuart Street layover and various MUNI substations, if these sites were to become all or partially surplus to MUNI's operational needs.

The information contained in this section was developed based on interviews with MUNI Capital Projects personnel and staff of the Department of Real Estate. We also reviewed a 1996 draft report commissioned by the San Francisco Municipal Railway Improvement Corporation (SFMRIC), a nonprofit corporation established to sell tax-exempt bonds for MUNI capital projects, entitled "Assets Development Study," by Douglas Wright Consulting and Economic & Planning Systems.

The various development opportunities that have been identified by MUNI and the SFMRIC consultants are summarized here. More detailed market and financial feasibility analysis of these options will be necessary, and we provide guidance on key questions that MUNI should answer prior to selection of any alternative. We recommend that MUNI incorporate consideration of property disposition options into development of a Master Facility Plan, and that such consideration should be secondary to providing fully functional operations and maintenance facilities for MUNI. MUNI also needs to clarify whether or not revenues from development or sale of MUNI property would be dedicated to MUNI prior to devoting resources to such development.

Kirkland Division

The Kirkland Division provides diesel bus maintenance and storage functions, and serves as the central location for the motor coach operating division. The Kirkland site is located on a full block of approximately 2.6 acres in the Fisherman's Wharf area. Over the forty years of MUNI operations at this site, the increasingly intensive tourism/commercial activities of the surrounding neighborhood have created a land-use pattern in which the Kirkland Division is an incompatible land use. Furthermore, as described in Section 3.1, the Kirkland Division is unable to fulfill its intended maintenance and operations functions because of site constraints. The SRTP includes a long range (i.e. post 2005) plan to relocate the Kirkland Division to the Islais Creek site.

Once the Kirkland Division is relocated, the Fisherman's Wharf site presents a prime development opportunity. The SFMRIC "Assets Development Study" analyses the financial feasibility of a hotel development on the site. The study was in draft form at the time that this management audit was prepared. The consultants were asked to assume that MUNI would not sell the site, but rather enter into a long-term ground lease with a private party for the commercial development of the site, thus potentially generating an ongoing source of revenue for MUNI. The draft "Assets Development Study" estimates that MUNI could obtain annual land lease revenues of $873,000 from a hotel development on the Kirkland site.

Although the hotel market study for the Kirkland site that is contained in the soon-to-be released "Assets Development Study" will provide useful information to MUNI decision-makers, MUNI will have to follow-up on this initial study by including the following factors into the feasibility analysis:

- How does the present value of the projected stream of income compare with the revenues that could be obtained from sale of the property? This analysis would have to include consideration of whether the City would permit MUNI to retain all or part of the revenues from such a sale -- or lease revenues from development -- in a dedicated fund, that could be invested and used for MUNI operations or capital projects.

- Can all key project assumptions, such as hotel occupancy rate projections, construction costs, etc. be verified? What are the break-even assumptions? How confident can MUNI be that the project variables will match these assumptions? A detailed hotel market study -- to complement the financial feasibility analysis that appears in the draft study -- would be required to verify and refine the financial projections.

- What are the anticipated hazardous materials clean-up costs at this site? Any site that has housed diesel bus maintenance and operations facilities for many years is likely to require at least some amount of toxics removal. These costs must be factored into the financial feasibility analysis.

These questions are not presented in order to discourage MUNI from pursuing this development opportunity. There is no question that MUNI could benefit greatly from having independent sources of ongoing income in the years to come. Rather, we suggest that MUNI will only be able to realize its development goals if administrators proceed based on comprehensive market and financial information of the kind that a private developer would require.

MUNI has been investigating the feasibility of relocating the Kirkland Division since 1977, and is presently receiving pressure from the business and local residential community in the Fisherman's Wharf area to pursue the relocation immediately. Although the Islais Creek site is currently being cleared, there are no plans (and no funds allocated) for actual development of MUNI facilities on the site until after 2005. With careful planning, this relocation might be accomplished prior to design of the other facilities that will eventually be located at Islais Creek (which include the Ways and Structures Division, and other potential uses such as a central maintenance facility, a component repair facility, or even a headquarters building). MUNI would have to proceed with caution if an early relocation of the Kirkland Division is attempted in order to ensure that the eventual best full use of the Islais Creek site would not be compromised.

949 Presidio Avenue

Demolition of the Presidio Division and MUNI Administrative Headquarters to make way for expansion of the trolley coach division and development of commercial space for lease is contemplated in the CIP as a long range project. The SRTP states that the trolley operations could either be expanded to Geary Blvd. on the lower level or expanded upward by double-decking. In either case, according to the SRTP, there is potential to use the air rights above the site for a joint development project. (This assumes that the option of rebuilding the headquarters at 949 Presidio will not be selected, as this site does not provide convenient access either to City Hall or to other MUNI facilities.) As in the case of the Kirkland Division, the air rights at the Presidio Division site will only become "surplus" once the MUNI headquarters has been relocated. This project is further complicated by the need to rebuild and expand the trolley division that will probably remain at the site. Nevertheless, the air rights at 949 Presidio present a potential opportunity for future revenues.

A joint development project could take the form of a commercial office, retail or multifamily housing project. As part of the "Assets Development Study" commissioned by SFMRIC, the consultants were asked to evaluate the financial feasibility of a condominium development on the site. MUNI would retain ownership of the land, and obtain a private developer under a long term ground lease for the residential portion of the site. They conclude that development of the portion of the site with frontage on Geary Blvd. into a condominium project could yield $230,000 annually in net revenues. However, the draft report also cautions that integrating a trolley maintenance and operations facility with a housing project presents difficult development and marketing constraints. They suggest that MUNI might wish to consider completely relocating all MUNI activities from the site in order to realize its full development potential.

Since MUNI's plans for the trolley facility already include demolition of the existing facility in order to build an improved and expanded facility, the idea of completely relocating the facility merits consideration. However, MUNI would have to determine whether suitable alternative sites are available, and how the costs of relocation would compare with reconstruction at the current location.

In further refining the analysis of joint development potential of the site, MUNI should address the following questions:

- Are there any examples, in the United States or elsewhere, of housing or commercial developments paired with trolley facilities? Evaluation of such projects would be extremely useful in planning for a mixed use at 949 Presidio Ave.

- Can the assumptions regarding potential condominium sales prices and absorption rates (sales per year) be verified by a detailed market analysis?

- How would construction costs be affected by factors related to the mixed use nature of the site? While the draft "Assets Development Study" addresses construction issues such as decking, MUNI also needs to consider steps that might need to be taken for noise abatement, elimination of toxics, etc.

However, it is crucial that MUNI first determine how this site fits into its long term operational framework. The need to provide a fully functional trolley division should take priority over revenue-generating schemes, although the two goals may be compatible.

Mission and Steuart Streets Site

MUNI owns a 34,375 square foot parcel at the corner of Mission and Steuart Streets, which is used as a terminus and layover lot for trolley and diesel bus lines that use Market and Mission Streets. Demolition of the Embarcadero Freeway has sparked both public and private activity in the area and greatly increased the potential commercial value of the site.

This area is in the midst of a major transition, with completion of the MUNI Metro Extension, development of the F-Line on Market Street and the Embarcadero, and the design of surface roadway improvements to replace the freeway. As noted in the draft "Assets Development Study," the planning processes that are currently underway for the Transbay Area and Justin Herman Plaza present a window of opportunity for consideration of options to relocate the layover lot (possibly to the planned Transbay Transit Terminal), in order to permit a commercial development on the Market and Steuart Street site. The draft study provides MUNI with an outline of a potential hotel/ground floor commercial project that would incorporate an F-Line stop within the building. The consultants project that revenues of approximately $495,000 per year could be generated for the City through a ground lease of this site.

MUNI will need to consider factors similar to those listed for the Kirkland project: a comparison of the income stream from a ground lease vs. sale of the property; determination of whether MUNI would be allowed to retain lease or sale revenues; verification of key market assumptions; and an assessment of any clean-up costs. Cost estimates of relocating the layover lot, as well as analysis of any operational issues this might raise, must also be weighed into the decision. However, the area is in transition and numerous public agencies are engaged in joint planning processes and interested in pursuing a coordinated strategy in this area. MUNI leadership should dedicate sufficient staff resources now to analyzing alternative layover lot sites and negotiation with the various public agencies involved, to ensure that this opportunity can be pursued in a timely fashion if a relocation of the layover function makes sense for MUNI.

Substation Air/Ground Rights Leases

Substations supply and distribute power to overhead lines for trolley coaches. MUNI currently has six substations located throughout the City, occupying a total area of 72,344 square feet, at the following locations:

Substation Location	Area (square feet)
Fillmore Street near Sutter Street	6,950
435 8th Avenue	6,000
79 Stevenson Street	4,644
NE Bryant & Alameda Streets	48,000
425 Andover Street	1,750
W. Russia & London	5,000

MUNI is currently leasing the ground rights to a portion of the substation located at 79 Stevenson Street, which is being used as a cafe by the tenants. The terms of the lease provide the City with rental revenues of $3.41 per square foot per month.

Lease of air rights to the Fillmore Street substation and the W. Russia Street substation have previously been considered for multifamily residential projects. The City Attorney advises that various factors, including uncertainty regarding possible health risks related to the substation electrical activities led that office to recommend against locating residential projects above such substations. However, the City Attorney's Office advises that these concerns would not preclude retail or commercial development above or below substations, such as that located at 79 Stevenson Street.

Further exploration of the lease potential of these substation sites could yield revenue opportunities. Because of their varying locations, it is not realistic to use the Stevenson Street lease as a measure of potential lease revenues for the other substations. MUNI could, however, obtain assistance from the Department of Real Estate (DRE) in selecting the substations that present the strongest lease potential for further environmental, zoning and market analysis, leading to additional air or ground leases.

Conclusions

MUNI currently has no surplus property. However, certain MUNI facilities do not serve MUNI well in their current locations. If the functions can be relocated to more appropriate sites, then the existing sites would become available for sale or development by MUNI. However, there are no funds programmed for such relocations in MUNI's 1995-2005 Short Range Transit Plan.

The primary sites that present possible future revenue opportunities are: (1) the site of the Kirkland Division motor coach facility, in the Fisherman's Wharf area; (2) the 949 Presidio Avenue site, currently used as a trolley division and as MUNI's administrative headquarters; and (3) a parcel at the corner of Mission Street and Steuart Street, currently used as a layover lot for trolley and diesel bus lines. A preliminary assessment of the development potential of these sites has recently been conducted by a consultant. In addition, there may be opportunities for lease of ground or air rights surrounding MUNI substations.

It is crucial that MUNI complete the Facilities Master Plan that is discussed in Section 3.1, to determine how each site fits into its long term operational framework. The need to provide fully functional maintenance, operations and administrative facilities for MUNI activities should take priority over real estate disposition strategies, although facilities plans and revenue-raising efforts may be compatible in some instances. Once MUNI's facility plans have been clearly defined, it will be necessary to obtain more detailed cost and market analyses of identified development options.

Recommendations

The Director of Public Transportation should:

3.2.1 Require that consideration of proposals for revenue-generating sale or development of MUNI property be incorporated into development of MUNI's Master Facility Plan. Give planners clear guidance that provision of fully functional maintenance, operations and administrative facilities for MUNI should be the first goal of the Master Facility Plan, so that any surplus property disposition plans must be fully compatible with MUNI's operational priorities.

3.2.2 Consult with City officials to clarify to what extent revenue that might be generated from sale or development of MUNI property would be dedicated to MUNI. MUNI should only expend resources from scarce operating and capital funds for property development if such expenditure will help MUNI to meet ongoing budgetary needs.

3.2.3 Following preparation of a Master Facilities Plan, pursue planning for anticipated surplus property by (1) obtaining more detailed market analyses, (2) quantifying any toxics cleanup costs, and (3) comparing the present value of the projected income stream from development with projected revenue from sale of the property.

3.2.4 Ensure that sufficient staff resources are dedicated now to (1) determine whether relocation of the Mission Street and Steuart Street layover facility makes sense for MUNI operations, and (2) participate effectively in negotiations with the various public and private entities in the Embarcadero/Transbay Terminal area regarding the status of the layover function and any development of MUNI property.

3.2.5 Obtain an opinion from the Department of Public Health regarding whether any possible health risks exist that would preclude commercial lease of ground or air rights at MUNI substations. If such leases do not pose a health risk, obtain the assistance of the Department of Real Estate in identifying and marketing substations with the strongest lease potential.

Costs and Benefits

Future sale or development of MUNI property that becomes surplus as a result of facility relocation could yield significant revenues to MUNI. Net revenue projections will have to be developed by MUNI using detailed market analyses and quantifying facility relocation costs and any site clean-up costs.

4. Acquisition of New Equipment

Proposition J requires that the Budget Analyst evaluate MUNI's current practice for acquiring new equipment. This is a particularly relevant topic since MUNI is currently embarking on a major fleet replacement program which will cost approximately $732.5 million over the course of the next ten years.

This section of the report includes two findings:

(1) Section 4.1 examines MUNI's current process for acquiring major equipment, and recommends methods for improving the quality of project information, the effectiveness of decision-making instruments to be used by MUNI management, clarifying management roles and responsibilities, and increasing accountability.

(2) Section 4.2 discusses the need to establish an effective warranty claims process as an extension of any equipment acquisition program (i.e., vehicles, equipment, vehicle components, and major parts). We recommend that warranty staff be added to the Department, to produce a net benefit of at least $432,400 annually during the period of the upcoming acquisition program.

These are described more fully in Section 4, below.

4.1 Capital Projects Management

- **Over the next ten years, MUNI will spend approximately $732.5 million on vehicle acquisitions. This will involve the purchase of LRVs, and trolley and diesel coaches.**
- **Perhaps even more important than the amount of these planned expenditures is the long term effect fleet acquisitions will have on the quality of MUNI service to the public. It is crucial, therefore, that MUNI manage these projects in a manner that results in the timely delivery of high quality vehicles that meet operational and maintenance needs from both a functional and financial standpoint.**
- **However, MUNI decision makers do not have a practical evaluation format to use when evaluating acquisition options, to ensure that full costs and benefits are considered. Furthermore, the roles and responsibilities of the project design phase are not clearly defined, contributing to the need for project changes at later, more costly phases of the project. Further, MUNI capital project cost and schedule control systems provide inadequate information to project managers, supervisors and funding sources.**
- **Accordingly, the organization of the functional analysis and design phases of capital projects needs to be clarified and structured. With the help of capital grants staff, project managers should maintain and update records of expenditures by funding source, and should be required to include true baseline information in project cost reports so that evaluation of projects is possible. Annual program plans should be prepared for each capital project which establish project milestones and line item budgets for the coming year; and compare planned, revised and actual milestones for the year just completed.**

MUNI is currently embarking on what will be a decade of fleet acquisitions, during which vehicles for all modes except cable cars will be completely replaced. The agency's options for the timing of such acquisitions are limited because most existing vehicles have reached or exceeded their useful life, as defined by the Federal Transit Administration (FTA). Delaying replacement would result in increased maintenance costs and missed service due to vehicle breakdowns. The fleet acquisition projects have therefore been given high priority in MUNI's Capital Improvement Plan.

Simultaneously, the Department is installing a complex new advanced train control system (ATCS) for light rail, completing the MUNI Metro Turnback (MMT) and Extension (MMX), and the F-Line, and carrying out other significant infrastructure projects. In addition, as was discussed in Section 3.1, the Capital Projects Division needs to coordinate the preparation of a Facilities Master Plan, so that replacement and/or enhancement of key facilities can be implemented as quickly as possible.

This section of the report examines the ability of the Capital Projects Division to deliver equipment (e.g. fleet) projects that meet the needs of MUNI's Operations and Maintenance Divisions, on time and within budget. Because of the limited scope of this management audit, we have focused on vehicle acquisition projects, since equipment acquisition was specifically listed as an audit topic in Proposition J.

This section of our report does the following:

- Reviews recent experience with vehicle acquisitions, including the purchase of 60 articulated trolley coaches and 77 light rail vehicles.
- Critiques the process currently used for organizing fleet acquisition projects, and proposes improvements to the process. We recommend that MUNI rank detailed objectives for each fleet acquisition; prepare an instrument for weighing options that directly takes into account the impact of each option on operational costs and functions; establish a formal process for decision-making, providing clear guidelines regarding roles and responsibilities of senior management and project managers; and consider a policy of assigning project management staff to manage fleet acquisitions in order to allow fleet engineers to focus on comprehensive analysis of specifications and designs.
- Evaluates the project control mechanisms used in the Capital Projects Division and proposes the development or refinement of various reporting instruments in order to promote greater accountability for project performance. We recommend that MUNI include the original, unrevised baseline budget in project cost reports; require capital grants staff and project managers to work together to prepare annual project plans that establish fixed project milestones for the fiscal year, and include a matrix allocating the line item budget to funding sources; and utilize the information from the revised project cost reports and annual plans to evaluate capital projects staff, improve budget estimation techniques, and identify critical cost/time elements so these can be addressed by management.

The information contained in this section was developed based on interviews with the staff of the Capital Projects Division, various supervisory staff of the Maintenance and Operations Divisions, MUNI's capital project consulting firm, and representatives of MUNI's primary capital funding sources (the Metropolitan

Transportation Commission (MTC) and the Transportation Authority). In addition, we reviewed MUNI's Capital Improvement Program (CIP) document, the Short Range Transit Plan (SRTP), various internal documents related to specific capital projects, the Transportation Authority's Strategic Plan, evaluations of MUNI prepared by the MTC, and a 1990 task force report on the organization of capital projects at MUNI.

Overview of MUNI's Fleet Project Management Process

The useful life of MUNI's transit vehicles ranges from 12 years for diesel buses to 18 years for trolley coaches. During the mid-1970s to early 1980s, MUNI's trolley and light rail vehicles, as well as half of the system's diesel coaches, were purchased at approximately the same time. These vehicles are therefore all reaching replacement age in the 1990s.

Because of the decade and a half that has elapsed since the last major vehicle purchases, MUNI is not simply soliciting bids for vehicles that are identical to those that will be retired. Several factors contribute to the need for a detailed design phase prior to going out to bid: (1) vehicle technology has changed in the interim, providing opportunities to improve vehicle performance, scheduling, or comfort; (2) the MUNI system has also changed, requiring a careful analysis of the number of vehicles needed based on projected ridership, desired headways, etc.; and, (3) MUNI officials state that conditions particular to San Francisco (such as the hills, old tracks with tight curves, etc.) necessitate the purchase of vehicles that are, in many ways, custom tailored for MUNI.

Capital Planning staff develop long term fleet plans which establish the number of vehicles needed, and the replacement plan for each mode. In preparation for a vehicle purchase in a particular mode, the Capital Projects Division sets up a project team, consisting of a project manager, fleet engineer, and representatives from Maintenance, Operations and the General Manager's Office. MUNI uses consultant Booz Allen & Hamilton extensively throughout the procurement process. At the outset of a project, the consultant meets with a variety of MUNI staff to identify issues and priorities; they also consult with properties that have recently completed the purchase of comparable vehicles.

MUNI uses performance specifications -- that is, specifications that focus on detailed performance requirements, rather than detailed construction plans. The consultant provides draft specifications to the project team, along with position papers on controversial issues. The project team has decision-making authority, although in practice administrators state that major issues are brought by the various project team representatives to the Deputy Director in charge of their respective divisions for input, and in some cases the General Manager makes the ultimate decision. Draft specifications are also distributed to potential manufacturers for comment prior to issuance of a Request for Proposal (RFP). MUNI conducts negotiated procurements for vehicles, in which bidders submit bids that identify the cost drivers, MUNI negotiates with each eligible bidder, and then a "best and final offer" is scored by a MUNI selection committee.

The selected manufacturer prepares design plans which are reviewed by the project engineers and the consultant. During the manufacturing period, MUNI conducts some on-site inspections. The manufacturer is then required to provide prototype vehicles, and MUNI typically requests modifications to the vehicle design prior to authorization of manufacture of the first shipment of fleet vehicles. Each vehicle is subject to a series of reliability tests before MUNI takes final acceptance.

Recent Procurements

MUNI has already begun the replacement of its trolley and light rail vehicle fleets. A review of the initial procurements in what will ultimately be a full replacement of the trolley, light rail and diesel fleets provides a guide to aspects of the process that need improvement.

Phase I Articulated Trolley Coach Purchase

MUNI started the effort to purchase 35 articulated trolley coaches (later increased to 60) in 1985. The existing trolley fleet consisted entirely of standard coaches, but MUNI management decided that articulated coaches would be the most efficient way to reduce peak hour overcrowding by providing more seats without requiring more trolleys and drivers. The consultant was asked to survey other properties using articulated trolleys. At that time Seattle was the only property in the United States using articulated trolleys, although some European cities were also surveyed. From the outset, therefore, this procurement was an example of a decision by MUNI to use relatively new technology, without an extensive track record, in order to achieve service improvements. The acquisition of articulated trolley coaches also necessitated a major renovation of the Potrero Division to accommodate the longer vehicles. We highlight this fact, not to question the merits of the decision, but rather to underscore the crucial tradeoffs that are made in the early stages of vehicle procurement.

Funding for this design phase was inadequate in the late 1980s, so plans were essentially on hold from 1987 to 1989. The performance specifications were finalized and an RFP issued in 1989. The project was managed by the Electrical Engineer who also had primary responsibility for technical analysis of consultant and manufacturer specifications and design plans. Staff from the Capital Projects Division's Project Management section were not involved with the process, based on a historical practice of using the Project Management Section (formerly part of the PUC's Utilities Engineering Bureau) to manage facilities and infrastructure projects, while the Fleet Engineering Section was responsible for fleet acquisitions.

In 1990 a contract was awarded to the New Flyer Corporation for manufacture of the articulated trolley coaches. Prototype models arrived in San Francisco in late 1992. The prototype testing phase, initially planned to take six months, was extended to one year because of various problems that were detected in the vehicles. These problems, which were not safety related but did impact reliability, were not completely resolved when MUNI received fleet vehicles during 1994 and 1995.

During the initial functional analysis phase of the design process, the consultant had been asked to profile the "worst case" trolley route, in order to determine the parameters of the performance requirements for the new vehicles. In other words, the articulated trolley performance specifications were designed to assure that all of the new trolleys would be able to handle the most difficult trolley routes in the City at an acceptable speed (in terms of grades and curves). As a result, the procurement specified a vehicle with a particularly high electrical current draw, so that it would have the power to accomplish the worst case routes.

This high current draw, however, places stress on the carbon sliders that link the trolleys to the current source. The manufacturer addressed this requirement by using non-standard carbon sliders, which have not performed up to the specification requirements, causing frequent breakdowns. As with the initial decision to purchase articulated coaches, the decision to require high current draw may well have been a sound one, but it necessitated the use of unproven equipment that should have received greater scrutiny prior to vehicle manufacture.

Another source of breakdowns in the new articulated trolleys has been frequent "hot coach detection," in which trolley coaches shut down because dirt and water create a path of electricity on the body of the coach that could potentially cause injury to anyone who touched certain areas of the outside of the trolley coach. No one has been injured, and the problem is not a safety issue. MUNI officials advise that vehicle safety systems unnecessarily trigger shut downs. However, the hot coach detection combined with the short useful life of the carbon sliders have produced vehicles with far greater maintenance requirements than were originally planned. Whereas the performance specifications called for at least 3,000 miles between road calls, the new articulated trolleys had only 500 to 600 miles between road calls in 1995.

This first procurement of articulated trolley coaches was originally scheduled to be received in 1991, according to MUNI's 1990-1999 Short Range Transit Plan (SRTP). The project was approximately two years behind schedule, and as of April, 1995 two of the vehicles had still not passed the vehicle acceptance tests. After adjusting the original budget for the increased number of coaches that were ordered, the $43.4 million project was approximately $1.3 million over budget, after exhausting project contingency funds. (While this represents a modest, three percent increase in costs, which MUNI officials state is entirely related to expansions in the project scope, we caution that it is unclear whether the baseline figures provided by MUNI represent the original baseline budget.) A related project, the $15.2 million renovation of the Potrero Division to accommodate articulated trolley coaches, also experienced a two year delay and a $2.3 million cost overrun, compared to the project's $13.5 million baseline budget at the time the construction bid was awarded. (See Section 1.7 for further discussion of this renovation project.)

Finally, in assessing the full cost of the procurement, it is important to take into account the maintenance costs of road calls which have occurred approximately five times more often than anticipated. It is too soon to know whether MUNI will be able to resolve the problems that have led to low miles between road calls, and thereby reduce ongoing maintenance costs for the articulated trolley coaches. Neither the Maintenance Division nor the Capital Division have allocated consistent staffing to analyze and resolve the outstanding problems that are causing the excessive road calls. (See Section 1.7 for recommendations regarding Maintenance Division engineering staff.)

Light Rail Vehicle (LRV) 2 Purchase

Like the articulated trolley acquisition, the LRV2 project started in 1989 with plans to purchase 35 vehicles. The procurement was eventually expanded to 77 vehicles. The project was coordinated for the first three years by the Fleet Manager and Vehicle Engineer, who had one Senior LRV Engineer to do specification and design review. A self-critique prepared by the LRV2 Project team in 1995 states that the Fleet Manager had too much control over the project, with inadequate communication between the consultant (again Booz Allen & Hamilton) and other team members from the Maintenance and Operations Divisions. The critique states that, "This project leader did not actively involve higher management levels from the other divisions into key project decisions." The Fleet Manager left MUNI in 1991, and the critique states that the consultant essentially managed the project until 1993. At that time, the MTC requested that MUNI appoint a Project Manager because regulatory agency reporting requirements were not being met. The procurement began to be coordinated by a member of the Capital Projects Division's Project Management Section.

The LRV2 project suffered from a problem that is common to long term capital projects: it is difficult to maintain consistent staffing for a project that may take five to eight years from inception to completion. In addition to losing the Fleet Manager, the project lost the one staff person dedicated to the acquisition by the Maintenance Division, who died in 1994. This person was eventually replaced with another representative from the Maintenance Division. Several representatives from the Operations Division were at various times involved with the project team, but their participation was part-time, and the actual representatives varied during the course of the procurement.

MUNI's original LRVs were purchased from Boeing in the late 1970s and early 1980s. These vehicles have had such a troubled maintenance history that the FTA agreed to reduce their useful life (i.e., the date at which the FTA would consider funding replacements) from the standard 25 years to 15 years. Early in the specification development phase of the LRV2 project, MUNI officials decided that the goal of achieving compatibility with the existing Boeing LRVs was not worthwhile. The planning process for the first new LRV acquisition was therefore started by having the consultant survey other properties to identify potential improvements that could be made to the subsystems (propulsion, braking and couplers) that have caused the major maintenance problems in the existing LRVs. According to the current project manager, significant improvements have been incorporated into the design of the LRV2 vehicles based on this analysis.

One major change that was unrelated to solving past maintenance problems was to increase the number of doors on each vehicle from six to eight per car. The purpose of this change is to reduce "dwell times" -- the amount of time the LRV has to pause at each station to load passengers. In order to accommodate the additional doors, the manufacturer, Breda Construzioni Ferroviarie, designed a vehicle that is two feet longer than the Boeing LRVs.

However, the longer cars present a problem because only three, rather than four, cars can be coupled for their underground runs in the metro tunnel. The coupling of fewer vehicles is necessary so that the entire train will fit at the West Portal, Forest Hills, Castro and Church Stations, without a portion of the train overlapping into the tunnel. Dwell times may still be reduced, because the curved Boeing cars can only open two doors in the tunnel (or eight doors per four-car train), while the new Breda trains are flush to the platform and can therefore open four doors per car in the tunnel (or twelve doors per three-car train). Nevertheless, the use of three cars rather than four reduces the overall capacity of each train. Muni managers concluded during the design phase that the reduced capacity would eventually be balanced by the increased throughput that is anticipated once the ATCS project is fully completed. As of the writing of this report, however, MUNI had not fully analyzed the costs and benefits in dwell time and ridership of this tradeoff, or made a decision regarding whether or not to renovate the stations at some later date so that four-car Breda trains can be accommodated.

The LRV2 procurement was originally planned for completion in late 1995, but is currently two years behind this schedule. Approximately four months of this delay was needed to accommodate the greater number of vehicles being manufactured. However, the remaining twenty months of delay were caused by: (1) clearance problems that arose because MUNI provided inaccurate information about clearance requirements in the specification, so that Breda had to make design changes to the original car body design; (2) inadequate coordination with the advanced train control system (ATCS) project, resulting in design changes to the LRV2 during manufacturing; and (3) numerous other design changes identified during prototype testing. After adjusting the budget that was established for 52 LRV2 vehicles to take into account the increase of 25 vehicles, the project is approximately $6.5 million over budget at a current projected total budget of $230.6 million. As with the articulated trolley procurement, this four percent cost overrun is not excessive, although approximately $3.3 million in project contingencies has also been used. The purpose of prototype testing is to identify needed design changes, so it is to be expected that some changes would be made at this stage. However, it is clearly preferable to avoid the need for time-consuming late-stage design changes. A further cause for concern is the relatively late initiation of renovation work at the Green Center to accommodate the new vehicles. MUNI management had planned to add this work to an existing, unrelated construction contract, but was directed to issue a new bid by the Transportation Commission. There will be a very short window of time in which the renovations must be completed to allow acceptance of the LRV2 vehicles as they are ready for delivery in late 1996 and early 1997.

Potential Improvements to Capital Projects Management

The management of major procurements such as the Articulated Trolleys and the LRV2 is a major challenge for any organization. These acquisitions occur so infrequently that few staff who were involved in the previous acquisition are likely to be available to lend valuable experience to the effort. In MUNI's case, multiple major acquisition projects must be implemented at the same time, which renders it difficult to assemble stable staffing teams who are experienced with similar acquisitions and also familiar with current technology.

The Capital Projects Division is making a laudable attempt to learn from the problems encountered in these recent projects to improve the process in current and planned acquisitions. For example, because certain problems were not fully identified in the prototype testing phase of the Articulated Trolley project, the prototype testing stage of the LRV2 project was lengthened. In addition, procedures for testing fleet vehicles have been bolstered, again in an effort to assure that vehicles are not accepted until they truly meet the performance specifications. The performance and warranty elements of bid specifications are also being reviewed and strengthened, largely in reaction to problems encountered with the ATCS project. These are valuable reforms, which will help MUNI to ensure that new vehicles perform at an acceptable level of quality and efficiency.

There are, however, a number of ways in which the process of managing these vehicle acquisitions, and other capital projects, should be improved. Specifically, (1) the organization of the early planning and design phases of the process needs to be clarified and structured; and, (2) project cost and schedule control needs to be streamlined to provide greater accountability. These issues are discussed below.

Project Organization and Decision-Making Structure

MUNI's organization along functional, rather than service mode, lines makes it difficult to ensure comprehensive review of key design elements of capital projects by operations and maintenance experts. The project team approach currently used for fleet acquisitions is a reasonable way to address this problem, but analysis and decision-making need to be structured to provide assurance that choices are made with full information and clear accountability on the part of MUNI's upper management group.

In MUNI's recent experience, some important operational and maintenance issues have only been recognized once a prototype vehicle is available, or even after fleet vehicles start to be placed in service. To some extent, this is to be expected. After all, the purpose of prototype testing is to identify needed changes with the benefit of an actual vehicle to run on the transit system prior to manufacture of an entire order. It would be unrealistic to expect a major procurement to occur without changes after the design review phase, and MUNI should be encouraged to pursue careful testing and make needed modifications at any stage of the process. However, improving the early analysis and design phases of the process would reduce the need for more costly modifications during manufacturing.

MUNI approaches fleet acquisitions with the following general goals:

- use of proven technology;
- obtaining reliable, maintainable equipment;
- achieving compatibility with existing equipment and infrastructure configurations; and,
- quality assurance.

However, recent acquisitions suggest that goals such as compatibility and use of proven technology are often relinquished in order to meet service improvement objectives. Examples from the cases sited above include (1) the purchase of articulated trolley cars before such cars were widely used; (2) the use of non-standard carbon sliders on the trolleys to accommodate their high current draw; and (3) the design of longer, wider LRVs to provide additional doors. Furthermore, MUNI has included an option for a low floor design in its current RFP for standard and articulated trolleys. The low floor, which facilitates boarding by seniors and disabled passengers, has been used by some European properties, but there is not a long history from which to analyze performance.

It is beyond the scope of this report to draw conclusions regarding the merit of these choices. Strong cases could be made to support each decision. But such trade-offs should be explicitly recognized by management, using the best available techniques for estimating their cost and service implications. This is particularly important given the recent directive of the Chairman of the Transportation Commission, who stated at a February 27, 1996 Condition Assessment meeting that MUNI should use only proven technology in new vehicles.

The Deputy Directors and the General Manager should develop and rank detailed objectives for each fleet acquisition at the outset of work on the project, for use by consultants and MUNI analysts to provide a consistent format for weighing the costs and benefits of alternative design elements, taking into account key operational, maintenance and finance issues. Among the areas that should be factored into any analysis are:

- Will this option require facility and/or infrastructure modifications? Their cost should be considered part of the project budget, required scheduling should be determined, and disruption to ongoing service or maintenance work should be addressed as part of the acquisition planning process.
- How will this option change demands on the Maintenance Division? With what level of certainty can performance according to specifications be predicted? In other words, what is the confidence interval of any estimate of maintenance frequency and hours?
- Will selection of this option increase or decrease ongoing operating costs, in both the Operations and Maintenance Divisions? Such costs should weigh heavily in the decision-making process, given MUNI's long-term operating deficit.
- How does this option impact the key project objectives that have been ranked by MUNI management? Any significant choice point should be systematically analyzed in terms of its positive or negative effect on achievement of each objective.

Although outside consultants could be used to perform such an analysis, it is critical that all relevant line supervisors and more senior managers sign-off on the validity of the analysis as it pertains to their operations. This calls for a more structured organizational process for capital project decision-making.

A 1994 task force assembled by the PUC, including representatives from the MTC and the Transportation Authority, recommended that the Capital Projects Division be reorganized to establish "distinct lines of responsibility and accountability within the capital program development and project delivery sections." According to members of the task force, the primary goal of this proposal was to give more weight to the program development (e.g. fleet planning, functional analysis and development of specifications) phase of capital projects. The task force report proposed new levels of mid-management to establish separate umbrella units for program development and project delivery in the Capital Projects Division.

We do not necessarily believe that it is necessary to create new layers of management to address these concerns, but there is a need to provide a consistent structure for decision-making that promotes thorough analysis of key issues prior to bidding of construction or manufacturing projects. The concerns raised by the task force were echoed in the internal assessment prepared by the LRV2 project team, which states that, "A strong, functioning project team must have the project team members' roles and responsibilities clearly defined and supported by the Deputy Directors and the Director."

The Director of Capital Projects, with input from the other Deputy Directors, should establish a formal process for decision-making on fleet acquisitions (and other capital projects that effect operations and maintenance activities). The roles and responsibilities of project team members and Deputy Directors should be defined. Using existing practice as a starting point, we have diagrammed a general procedure for functional analysis of procurement projects on the next page (Exhibit 4.1.1).

Whatever specific process is adopted, a plan should provide clear guidelines regarding (1) what types of decisions should be referred to the upper management (e.g. Deputy Directors) group, (2) the responsibilities of team members in obtaining input and consensus from line managers and senior management in Operations and Maintenance; and (3) the respective responsibilities of the consultant and the MUNI project manager in presenting decision packages to the project team and to the Deputy Directors, in a consistent cost-benefit format.

Project Cost and Schedule Control

Project management could also be strengthened by providing greater accountability for cost and schedule control. Our analysis did not document a major problem with cost overruns in fleet acquisition projects, but it was unclear whether comparisons of actual spending with project budgets were based on original budgets, or budgets that had been revised. We found that MUNI's project control methods make it extremely difficult to pinpoint exactly how and why a project's budget and schedule have changed over the course of the project, particularly on non-contract line items. We also found that the agencies which allocate the bulk of MUNI's capital funding (the MTC and the Transportation Authority) have long been frustrated with the quality of the information they receive from MUNI regarding capital project budgets.

Several major capital projects, including the vehicle acquisitions, the ATCS project, and the Potrero Renovation, have experienced significant delays. While valid reasons exist for many of the delays, improved project control would help supervisors to pinpoint those chronic sources of delays or cost increases that might be responsive to changes in procedure.

EXHIBIT 4.1.1

VEHICLE ACQUISITION
PROPOSED DECISION-MAKING PROCESS

Project-Specific Goals Setting

Upper management defines and ranks procurement goals.

Identification of Significant Options

- Project Team members survey key MUNI personnel.
- Consultant surveys other properties & manufacturers.
- With direction from project manager, consultant conducts analysis of options based on procurement goals, using cost/benefit criteria.

Divisional Review of Options Analysis

- Each Division representative proposes personnel to review and comment on options analysis, based on areas of responsibility and expertise. Deputy Director of each respective Division approves selection of staff to conduct review.
- Relevant personnel comment in writing on options analysis.
- Each Deputy Director provides final approval for divisional comments on options analyses.

Options Decision-Making

- Team members bring Division comments to project team for review, possible further analysis.
- Project team makes written recommendation on each option, justified with reference to ranked procurement goals, cost/benefit impacts.
- Deputy Directors review project team recommendation, consultant analysis and divisional comments. Final decision on each significant option by Deputy Directors (as a group), provided in writing.

In general, MUNI project managers are less involved with financial control than are their counterparts in capital project management at the San Francisco Department of Public Works (DPW), or at other properties such as the South East Pennsylvania Transit Authority (SEPTA). Instead, financial management has been largely the responsibility of capital grants staff. Both funding agencies and MUNI administrators have described instances in which the grants staff and the project manager (whether a fleet engineer or a member of the project management section) had conflicting information regarding the status of budgets and expenditures on a project. MUNI's capital grants staff were part of the Finance Division until February 1996, when the organization responded to long-standing recommendations from the Transportation Authority and the FTA by moving these staff persons to the Capital Projects Division. This organizational change should improve coordination between the capital grants staff and project managers.

Although the capital grants staff are now part of the Capital Projects Division, Finance Division accounting staff are responsible for maintaining the financial records that are used to bill funding sources. The Project Services Section of the Capital Projects Division maintains separate "Project Cost Reports." These reports show the total dollars appropriated to a particular budget item, but are not linked to expenditures from particular grants. The MTC has attempted to assist MUNI in developing a better system to ensure that a particular project cannot overspend its allocation from a particular grant, without addressing the remaining project(s) that might be underfunded as a consequence, but to date the system is inadequate.

The Project Cost Reports compare actual spending to budgets, but the budget figures listed as "original budget" in fact reflect the most recently approved modification to the original baseline budget. In other words, the baseline budget is actually a moving target that can be changed, with the approval of the Deputy Director, for a wide variety of reasons. Allowable causes for a baseline change include:

- Bid protests;
- Funding delays or changes in funding levels;
- Major scope changes;
- Accumulation of a large number of small work scope changes;
- Changed conditions during construction;
- Delays by other departments or agencies;
- Substantial economies that can be achieved through value engineering; and,
- Contractual requirements
- Other reasons for which the consequence of not allowing a change is substantially more adverse than the risk of delay and increase in costs

These broadly defined justifications for changes to a project's baseline budget or schedule can mask deficiencies in the management of capital projects. Although "errors and omissions" are considered unallowable causes for baseline change, the distinction between these and work scope changes is unclear.

While we recognize that the complex, long term nature of capital projects, particularly fleet acquisitions, will naturally require occasional changes in scope or encounter unanticipated delays beyond the control of the project manager, the absence of records available to project managers and their supervisors regarding original budgets and schedules removes an important management tool. Some MUNI administrators argue that change order documentation is sufficient to address this need for historical project records. However, it is important to have a single document that shows a full historical picture of the project. The San Francisco Department of Public Works (DPW) includes a column for the original budget in monthly cost reports. (MUNI has such a column, but in practice it contains the most recently approved modification to the baseline budget.)

For example, with the current system, it would be time consuming and cumbersome for a supervisor to determine whether the original budget allocation of MUNI engineering staff to a particular project had proved to be realistic, based on actual project data. In fact, it is not clear that the supervisor would be able to obtain the original line item budget for the project. Future project budgeting thus cannot draw effectively on past MUNI experience, which is a basic budgeting tool. When records of original baseline budgets and schedules for projects completed in the past three years were requested for this management audit, the Project Services Section responded that such records were not retained. MUNI thus has no straightforward way to evaluate its accuracy in capital projects budgeting, or to pinpoint areas for improvement in the implementation process. Project baseline budgets, starting with the original baseline budget, should be key documents retained by project managers.

SEPTA, the Philadelphia area transit agency, requires project managers to submit an annual program plan for each capital project. This plan lists project milestones for the coming year. Project managers must compare actual progress to these milestones, which are frozen until the next annual program plan, on a monthly basis. The following year's annual program plan will include a comparison of planned, revised and actual milestone dates for the year just completed. A summary of the line item project budget is also included in the annual program plan, with a comparison of budget to actual spending. This must be fully revised upon any major budget change. MUNI's Capital Projects Division should develop a similar reporting system, for use in project control and in evaluating project staff.

Conclusions

Over the next ten years, MUNI will spend approximately $732.5 million on vehicle acquisitions. This will involve the purchase of LRVs, and trolley and diesel coaches.

Perhaps even more important than the amount of these planned expenditures is the long term affect fleet acquisitions will have on the quality of MUNI service to the public. It is crucial, therefore, that MUNI manage these projects in a manner that results in the timely delivery of high quality vehicles that meet operational and maintenance needs from both a functional and financial standpoint.

However, MUNI decision makers do not have a practical evaluation format to use when evaluating acquisition options, to ensure that full costs and benefits are considered. Furthermore, the roles and responsibilities of the project design phase are not clearly defined, contributing to the need for project changes at later, more costly phases of the project. Further, MUNI capital project cost and schedule control systems provide inadequate information to project managers, supervisors and funding sources.

Accordingly, the organization of the functional analysis and design phases of capital projects needs to be clarified and structured. With the help of capital grants staff, project managers should maintain and update records of expenditures by funding source, and should be required to include true baseline information in project cost reports so that evaluation of projects is possible. Annual program plans should be prepared for each capital project which establish project milestones and line item budgets for the coming year; and compare planned, revised and actual milestones for the year just completed.

Recommendations

The Director of Public Transportation should direct MUNI's senior managers to:

4.1.1 Develop and rank detailed objectives for each fleet acquisition at the outset of work on the project, to provide a consistent format in weighing the costs and benefits of alternative design elements.

4.1.2 Develop an evaluation format for reviewing options related to procurements and other capital projects that directly takes into account (1) increases or decreases to ongoing operational costs; (2) any facility or infrastructure changes that would be necessitated from selecting a particular option and (3) the detailed overall project objectives developed pursuant to Recommendation 4.1.1.

4.1.3 Establish a formal process for decision-making on fleet acquisitions, providing clear guidelines regarding (1) what types of decisions should be referred to the Deputy Directors as a group; (2) the responsibilities of team members in obtaining input and consensus from line managers and senior management in Operations and Maintenance; and (3) the respective responsibilities of the consultant and the MUNI project manager in presenting decision packages to the project team and to the Deputy Directors, in a consistent format. Recommendations from project teams and decisions by the Deputy Directors should be documented.

4.1.4 Consider adopting a policy of assigning staff from the Project Management section of the Capital Projects Division to manage fleet acquisition projects, thereby allowing fleet engineers to focus on comprehensive analysis of specifications and designs.

4.1.5 Include the original, unrevised baseline budget, (using the construction budget as of the bid award as the baseline for the construction portion of the budget, while establishing non-contract baselines as of project initiation), as a column in project cost reports and in annual project plans.

4.1.6 Require capital grants staff and project managers to work together to prepare annual project plans that establish fixed project milestones, for both budget and schedule, for the fiscal year, and that include a matrix allocating the line item budget to funding sources. Revise monthly cost reports to include comparisons of annual baselines to actual project progress. Annual project plans should include a historical overview, with cost figures and narrative explanations, of changes to baselines and milestones.

4.1.7 Utilize the information from the revised project cost reports and annual plans to (1) evaluate capital projects staff; (2) improve budget estimation techniques; and (3) identify sensitive cost/time elements so these can be addressed by management.

Costs and Benefits

The above recommendations can be implemented without additional cost. While cost savings from these procedural and organizational reforms cannot be projected, MUNI plans to spend approximately $732.5 million in federal, State and local Proposition B Transportation Sales Tax funds on fleet acquisitions over the next ten years. The vehicles that are purchased will effect MUNI operations and maintenance costs for nearly two decades. Improvements to the management of capital projects will thus have significant, system wide financial and operational benefits.

4.2 Warranty Administration

- **The Public Transportation Department does not currently have a formal dedicated warranty program that covers new vehicle procurement, parts, and contract repair work. A dedicated warranty program should be established with staff who are responsible for identifying warranty problems with vehicles and equipment, and submitting, monitoring and collecting on warranty claims.**
- **Although no warranty program currently exists, MUNI collected an average $800,000 annually between 1984 and 1989 in warranty claims. That amount declined to $27,000 annually between 1989 and 1992, and thereafter MUNI has not reported any reimbursements.**
- **The addition of a MUNI fleet and parts warranty program, with dedicated staff, would generate warranty reimbursements, and credits from manufacturers and parts vendors, which would exceed program cost. We estimate that two additional staff costing an estimated $67,600 per year would result in at least $500,000 in annual savings, based on credits and reimbursements received in prior years and the planned purchase of $732 million in new revenue vehicles over the next ten years.**

At the present time, the Transportation Department does not have dedicated staff who perform warranty work for new revenue vehicles and replacement parts. In the past, maintenance managers--including superintendents, senior controllers and others--have been given the limited duties and responsibilities of a warranty administrator along with other assigned tasks. This approach led to costly mistakes that affected MUNI's ability to place a sufficient number of diesel buses and electric trolley coaches on the street to meet daily peak hour transit demands.

Maintaining accounting records of warranty reimbursement have been sporadic, and none have been kept since 1992.[1] Between 1984 and 1992, when financial records were kept, MUNI received varying amounts of warranty credits and reimbursements. The accounting of warranty reimbursements for the eight year period 1984 through 1992 is summarized below.

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[1] Based on information provided by the Finance, Administration and Personnel Division.

Table 4.2.1

Maintenance Warranty Reimbursements for the Nine Year Period 1983 through 1992 San Francisco Municipal Railway

Fiscal Period	Actual Amount	Average Annual Amount
FY 1984 through FY 1988	$3,200,000	
Annual Average ('84-'88)		$800,000
FY 1988-89	1,847	
FY 1989-90	61,860	
FY 1990-91	25,118	
FY 1991-92	19,425	
Total	$108,250	
Annual Average ('88-'92)		$27,063

The annual average reimbursements during the mid-eighties were associated with the delivery of 280 diesel buses (180 Old Flyer and 100 MAN Diesel Buses). Discussions with Maintenance Division managers indicate that since 1989 there have been no dedicated and knowledgeable staff assigned to a warranty tracking and reimbursement program. However, during this period, MUNI accepted the delivery of 233 diesel buses and electric trolley coaches (106 New Flyer, 45 Orion, 24 New Flyer Articulated Diesel Buses, and 58 Electric Articulated Trolley Coaches). Clearly, there should have been a much greater return on warranty claims over the last six years--at least to the level achieved in previous years.

Although warranty staff have been included in several initial budgets proposed by MUNI over the years, those personnel requests were deleted in final budgets because new staff was proposed and because there were major immediate and competing needs from other City agencies.

MUNI has currently reassigned a Senior Maintenance Controller to compile and review warranty provisions for revenue vehicles purchased between 1989 and 1992 and to confer with the City Attorney to determine what warranty claims can be negotiated for credit and/or reimbursement. MUNI has also proposed two new management positions in its 1996-97 budget: a Warranty Fleet Manager and a Warranty Quality Assurance Officer, for an anticipated annual cost of $135,160, as follows.

Table 4.2.2

MUNI Proposed Warranty Program
Annual Personnel Costs for FY 1996-97

Class	Title	Count	Bi-Weekly Compensation	Cost
(New)	Warranty Fleet Manager	1.0	2.080-2,080	$54,065
(New)	Warranty Quality Assurance I	1.0	2,080-2,080	54,065
	Subtotal	2.0		108,130
	Fringe Benefits			27,070
	Total			$135,200

Instead of two new warranty management positions, we recommend the addition of one Warranty Administrator position and one-half time Senior Clerk Typist to provide clerical support for the warranty program, and to free the Warranty Administrator from clerical tasks[2]. This would fulfill the need for a dedicated warranty program for new vehicles, component systems and parts. Annual costs to provide a Warranty Administrator and one-half time 1426 Senior Clerk Typist would be $67,600 or 50 percent of the MUNI's proposed $135,200, as follows:

Table 4.2.3

Maintenance Division
Annual Personnel Costs for a Warranty Program

Class	Title	Count	Bi-Weekly Compensation	Cost
(New)	Warranty Administrator	1.0	2.080-2,080	$54,065
1426	Senior Clerk Typist	0.5	1,104-1,336	0
	Subtotal	1.5		54,065
	Fringe Benefits			13,535
	Total			$67,600

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[2] The Senior Clerk Typist would be shared equally with the recommended additional staff for Materials Management as discussed in Sections 1.6 and 2.4 of this report.

Because MUNI has not formulated any written policies and procedures regarding negotiating and fulfilling the warranty provisions set forth in vendor contracts, this should be a first task for the new Warranty Administrator position. These policies and procedures should be used both to serve as a guide and clarification of the terms and conditions for existing contracts with warranty provisions and to provide a standard for warranty negotiations for future contracts with manufacturers of rolling stock and major vendors for parts.

In addition to developing policies which clarify major vendor warranties, a warranty administrator should develop procedures for identifying costs to be reimbursed through a warranty claims process, and the processing of such claims. These procedures should include:

- Identifying acceptance and in-service dates on all new rolling stock, providing a listing of all vehicles under warranty to MUNI, providing written procedures for maintaining the warranty program, and updating warranty coverage, as appropriate.

- Working with maintenance controllers to identify work orders which may be covered by warranty, completing initial information on vendor warranty claim forms and ensuring all parts are tagged and prepared for return to the manufacturer or vendor.

- Requiring the Parts Storekeepers to issue a new warranty part on an exchange basis only, in order to insure that there is inventory control on parts under warranty. The old part would then be stored in a designated area until sent to a central location, such as Pier 72.

- Completing the remainder of the warranty claims form and processing with the vendor based on a review of the work order and appropriated parts information by the warranty administrator.

- .Maintaining all records of warranty transactions by the Warranty Administrator.

Important to this operation is the accurate logging of in-service dates. Facility supervisors should report all in-service dates to the Warranty Administrator as part of the regular process for receiving new vehicles. This reporting is complex when there are different mileage and time conditions for each of the major vehicle systems such as the frame, air conditioning, engine and transmission. In addition, vehicle subsystems such as wheel chair lifts, destination head signs, radio, and farebox should be covered under separate vendor agreements. Mileage and times are further complicated when new vehicles are accepted on various dates over a several month period, or are retrofit with new equipment and sub-systems over the vehicle life.

Therefore, it is important for the Warranty Administrator to develop a process and keep track of several different warranties on individual revenue vehicles. The warranty administrator's role should be to ensure that maintenance shift supervisors and controllers, who are concerned about providing a sufficient number of vehicles to meet the day's peak hour runs, appropriately maintain records of warranty information.

MUNI has also not established procedures for tracking and claiming reimbursements or credits on modules and parts that fail on vehicles which are no longer under warranty. Often these items may be covered under a separate parts warranty with a parts vendor.

Tracking warranties on individual parts can be a complex and time consuming process. In order to accomplish this effectively, it is necessary to record the initial installation date of the part, the coach mileage at the time of installation, and any other information required by the warranty agreement. If a part should fail, the capability to retrieve this information quickly and to document that the failure occurred within the time frame of the warranty must exist.

Most existing warranty agreements with parts vendors base their warranties on time and mileage criteria beginning with the point at which the parts storekeeper receives the part, not the point at which it is installed on the vehicle. As a result, many parts could have their warranty expire prior to actual use. Items such as batteries have a limited shelf life and, therefore, this is probably a justified period for determining the time of warranty. However, most parts have an indefinite shelf life and wear on the part does not begin to occur until actual use on a vehicle.

Because of the volume of parts purchased by MUNI from its major parts vendors is significant, agreements which base warranty time periods on installation dates could probably be negotiated. We believe that a warranty program should be established to track and to claim credit or reimbursement on parts failures which occur during the warranty time frame if such warranty contract modifications could be implemented.

For example, MUNI currently contracts with outside vendors to rebuild diesel engines. These rebuilds have a one year, or 100,000 mile warranty on major parts used to complete the rebuilt engines. Two of the major components are the 6V92 Diesel Engine (mechanical or D-deck) which costs between $11,000 and $14,000[3], and the 747 Atec Allison Automatic Transmission which costs between $5,000 and $14,000[4]. Since approximately 130 of these engines are programmed for replacement each year, there is an estimated annual value between $2.1 million and $3.6 million annually in warranties. Because MUNI does not have a dedicated program to track what happens to these rebuilt engines after the diesel buses are returned to service, there is currently no opportunity to pursue warranty claims for reimbursement on these components within the warranty period.

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[3] An additional $3,000 is required if the engine core needs to be replaced.

[4] $5,000 for a rebuilt transmission and $14,000 for a new transmission.

The Warranty Administrator, along with maintenance supervisors and controllers, should mutually agree upon which vehicle components to track to determine their estimated failure threshold and replace them prior to a break-down of the vehicle.

MUNI plans that approximately $732 million in new rolling stock will be acquired over the next ten years. Based on an annual cost of $73.2 million in new vehicles and an additional estimated annual cost of $10 million for modules and parts, we conservatively estimate that $500,000 in annual saving can be realized in warranty credits and reimbursements over the next ten years. As noted earlier, MUNI reported an average $600,000 annually in warranty credits and reimbursements between 1984 and 1988.

Conclusions

The Department of Public Transportation does not currently have a formal and dedicated warranty program that covers new vehicle procurement, parts, and contract repair work. A dedicated warranty program should be established with staff who are responsible for identifying warranty problems with vehicles and equipment, and submitting, monitoring and collecting on warranty claims.

Although no warranty program currently exists, MUNI collected an average $800,000 annually between 1984 and 1989 in warranty claims. That amount declined to $27,000 annually between 1989 and 1992, and thereafter MUNI has not reported any reimbursements.

The addition of a MUNI fleet and parts warranty program, with dedicated staff, would generate warranty reimbursements, and credits from manufacturers and parts vendors, which would exceed program cost. We estimate that two additional staff costing an estimated $67,600 per year would result in at least $500,000 in annual savings, based on credits and reimbursements received in prior years and the planned purchase of $732 million in new revenue vehicles over the next ten years.

Recommendations

The Mayor and the Board of Supervisors should:

4.2.1 Approve staff and funding for a Warranty Administrator position and clerical support, as described in this finding.

The Director of Public Transportation should:

4.2.2 Assign the authorized staff to a dedicated program to administer warranties for new revenue vehicles, major vehicle repairs, and parts;

4.2.3 Establish procedures which require the Warranty Administration to develop and recommend warranty terms and conditions to be included in all contact proposals for vehicle and parts purchases and rehabilitation;

4.2.4 Amend on-going parts supply contracts to include more specific warranty language, as developed by the Warranty Administrator;

4.2.5 Formalize a process for capturing all in-service information on new revenue vehicle purchases as is required for warranty purposes;

4.2.6 Initiate negotiations with major parts suppliers to base warranty time periods on vehicle installation dates rather than the date a part is received;

4.2.7 Review detailed coach repair and parts issue records on a periodic basis to provide more accurate and timely identification and processing of warranty claims;

4.2.8 Enforce a policy requiring that all parts with warranties be dispensed on an exchange basis only. In order to identify these parts, a parts exchange list and parts issue log should be developed and utilized; and,

4.2.9 Develop a cross referencing system to identify and to match maintenance work orders and component failures by individual vehicle number. Use this system for claim follow-up and analysis.

Costs and Benefits

Implementation of these recommendations would result in costs of $67,600 for warranty program staff.

We conservatively estimate that such a program would generate at least $500,000 in annual savings, based on actual credits and reimbursements received in prior years, and on estimated purchases of $732 million in new revenue vehicles and $10 million annually in major replacement modules and parts over the next ten years.

Accordingly, MUNI should realize a net benefit of at least $432,400 annually after implementation of these recommendations.

5. Salaries and Benefits

Proposition J requires that the Budget Analyst review salaries and benefits as part of this management audit. The scope of our review was limited by several factors.

(1) Compensation for employees of the City and County of San Francisco is generally determined based on negotiations between City and County management and labor representatives. By policy, the City and County surveys jurisdictions for most employee classifications. However, Charter Section A8.404 requires that:

- The salaries of Platform Operators be set at the average of the two highest paid properties in the United States which serve a population of 500,000 or more;

- The benefits for Platform Operators be set at the average of the two highest benefit packages at properties in the United States which serve a population of 500,000 or more.

The properties used in the salary and benefit surveys can be different, so that a maximum of four properties can be compared to set the salaries and benefits of Platform Operators. There are no legal requirements for non-Platform Operator employee surveys.

We reviewed the Civil Service salary surveys for MUNI employees and determined that the survey prepared for Platform Operators is consistent with the City Charter. Other salary surveys made appropriate comparisons for use by City and County managers during negotiations.

(2) The scope of this management audit, as determined by the funding level designated in the Proposition J text, limited our ability to conduct an extensive, independent salary and benefit survey.

In order to provide increased management flexibility for negotiating salary and benefit levels for Platform Operators, the Charter of the City and County of San Francisco would need to be modified. For all other classifications, salary and benefit setting is largely a policy matter and is subject to negotiation between management and labor. We therefore make no recommendations on salary and benefit setting in this report.

However, we believe it is important to comment on Platform Operator Work Rules and how they impact services and costs of the Municipal Railway. Although issues related to Work Rules are also subject to negotiation with labor, there are real efficiencies in scheduling which can be gained by modifying some MOU provisions.

Section 5.1 of this report therefore examines MOU provisions and Work Rules which we believe are efficiency rather than straight compensation issues for MUNI and the Platform Operators. The results of changing MOU provisions, as recommended in this report, would result in annual savings of approximately $3.2 million per year and improve scheduling efficiency. By policy of the Mayor and the Board of Supervisors, these savings could be paid to Platform Operators on some other equitable basis that would not impact operating efficiency.

Our review of these issues and recommendations are included in Section 5.1, which follows.

5.1 Work Rule Impacts on Service and Costs

- **The current MOU for Platform Operators contains various work rules which are inconsistent with the practices of other major transit operators nationally and within the Bay Area, and impact the ability of management to efficiently operate the Municipal Railway.**
- **Management should develop a negotiating package which clearly separates operator efficiency from compensation issues, and approach the union with a proposal for modification to the current bargaining agreement which would allow more efficient use of platform salary appropriations.**
- **The combined savings from recommendations contained in this finding would result in savings of at least $3.2 million per year which would be saved by reducing the number of non-productive operator hours which must be scheduled to provide current services, and result in more efficient use of platform operator resources. These savings could be reprogrammed for other MUNI services, or used to obtain program enhancements that mutually benefit employees and the public, such as increased training for vehicle operators.**

Certain provisions of the Platform Operator's MOU, including salary and benefit benchmarking and similar provisions, are clearly compensation issues which are subject to negotiation and policy of the Mayor and Board of Supervisors. Other provisions impact the ability of MUNI to operate efficiently and result in payment to operators for non-productive time.

We identified six work rules in the current MOU which reduce scheduling efficiency and result in unnecessary increased costs. In order to determine prevailing work rule practices in the transit industry, we requested that MUNI provide any available information on practices at other properties.

Based on this request, we received information on seven other transit properties. In order to increase the scope of this work rule comparison, we independently contacted three additional transit properties which are similar in size and complexity to MUNI. The detailed results of this work rule comparison is included as Appendix 5.1.1. The work rules which were included in the survey are as follows:

1. Limitation on Use of Part Time Operators

The MOU allows MUNI to utilize a maximum of 12 percent part-time operators to full-time operators. Six of the ten properties surveyed allowed a higher percentage of part-time operators than are allowed in MUNI's current MOU.

Part-time Platform Operators are only paid for actual time worked and are not eligible for split-time pay. Therefore, if the MOU allowed a higher percentage of part-time operators to drive on runs which are currently staffed by full-time operators, fewer split runs would require payment of non-productive split time pay. Each one percent increase in part-time operators results in an estimated savings of $500,000 annually. An increase from the current 12 percent part-time operator limitation to 14 percent, for example--which would still be less than five of seven respondent properties--would result in savings estimated at $1.0 million per year.

2. Requirement to Schedule Saturday and Sunday as Days Off

The MOU requires that a minimum of 700 operators (amended to 650 operators by a side letter) be scheduled to have both Saturday and Sunday as days off. None of the ten transit properties surveyed are required to schedule any number or percentage of their operators off on both Saturday and Sunday. Eliminating this requirement would allow the Municipal Railway more flexibility when scheduling weekend service. Municipal Railway staff estimate that as much as $100,000 in annual scheduled overtime premium pay could be eliminated if this requirement was eliminated.

3. Split-Time Overtime Penalty

Operators are paid overtime (split-time) for all hours scheduled to be at work in excess of 10 hours, even if total work time is 8 hours or less. This provision is also included in Section A8.450 of the City Charter. Of the ten transit properties surveyed, only Boston and Washington DC require payment of overtime after 10 hours. The remaining eight transit properties are not required to pay split-time pay until 10 hours and 30 minutes, or longer. An increase to 11 hours instead of 10 hours would result in savings to the Municipal Railway of an estimated $200,000 per year.

4. Maximum Scheduled Time Per Day

The MOU prohibits the Municipal Railway from scheduling part-time or full-time operators to be at work in excess of 12 hours unless the operator agrees. This limitation requires the Municipal Railway to add runs on certain lines to meet the scheduled service at greater cost than paying additional overtime. All of the ten transit properties surveyed are allowed to schedule spread times of more than twelve hours for all or part of their operators. Municipal Railway scheduling staff estimate that savings of at least $100,000 annually could be achieved if spread times of twelve and one-half hours were allowed by the MOU.

5. Number of Months Driving To Reach Maximum Salary

Newly hired Platform Operators presently receive maximum platform operator pay after 18 months from the date of hire. All of the ten transit properties surveyed require 30 months or more before operators are paid the maximum rate of pay. If this 18-month time period was increased, any operators currently in training could be allowed to continue under the current 18 month progression. Therefore, the compensation received by existing Platform Operators would not be reduced by a change in the new hire progression. Municipal Railway staff estimates that changing from an 18 month to a 36 month progression would save approximately $300,000 in the first year, and $1.5 million when fully implemented.

6. Limitation on Driving Time

Operators assigned to more than six hours of continuous work are paid 20 minutes straight-time pay in lieu of a lunch period. Only three of the ten transit properties surveyed have similar requirements for additional pay in lieu of a lunch period. Two of the transit properties surveyed have limits on continuous driving time. The remaining five transit districts surveyed had no limitation in their labor agreements on continuous driving time. Scheduling staff of the MUNI estimate that the payment of additional pay in lieu of a lunch period results in increased costs of $1.5 million annually.

Although the recommendations contained in this report would result in substantial savings to MUNI, the Mayor, Board of Supervisors, and management may wish to consider using any savings in a manner which would provide benefits which would mutually benefit the public and labor. For example, savings could be used to provide increased training to operators, or be used to provide enhanced system security. The implementation of these recommendations, and the subsequent use of any savings which may be achieved, are policy matters for the City and County to consider as they negotiate the next labor agreement with the union.

Conclusions

The current MOU for Platform Operators contains various work rules which are inconsistent with the practices of other major transit operators nationally and within the Bay Area, and impact the ability of management to efficiently operate the Municipal Railway.

Management should develop a negotiating package which clearly separates operator efficiency from compensation issues, and approach the union with a proposal for modification to the current bargaining agreement which would allow more efficient use of platform salary appropriations.

The combined savings from recommendations contained in this finding would result in savings of at least $3.2 million per year which would be saved by reducing the number of non-productive operator hours which must be scheduled to provide current services, and result in more efficient use of platform operator resources. These savings could be reprogrammed for other MUNI services, or used to obtain program enhancements that mutually benefit employees and the public, such as increased training for vehicle operators.

Recommendations

The Director of Public Transportation should:

5.1.1 Develop a negotiating package which clearly separates efficiency from compensation issues, and approach the union with a proposal for modifying the current bargaining agreement to allow for more efficient use of platform salary appropriations.

5.1.2 Identify potential program enhancements that mutually benefit employees and the public, such as increased training and safety on transit vehicles.

Costs and Benefits

Implementation of these recommendations would not result in any additional costs. The Municipal Railway would reduce its platform hour requirement, resulting in reduced costs of as much as $3.2 million annually. The public and labor would mutually benefit from program enhancements in lieu of these MOU provisions.

6. Passenger and Driver Safety

Proposition J requires that the Budget Analyst evaluate passenger and driver safety on MUNI. For purposes of this management audit, we defined this as a review of system security and law enforcement. Issues related to operating safety (e.g., accidents, workers compensation injury rates, etc.) are not addressed in this section, although references to some of these issues can be found elsewhere in this report.

The public and the Transit Workers Union Local 250A have focused considerable attention on the incidence of criminal activity on MUNI vehicles during the past several years. Section 5.1 of this report examines "trouble" activity on transit vehicles and at stations and stops during the past 18 to 24 months, and evaluates efforts by MUNI and the San Francisco Police Department to improve passenger and driver safety. Our findings related to these matters are contained on the following pages.

6.1 MUNI Security

- **The San Francisco Police Department's MUNI Transit Company police officers are effectively deployed given current SFPD personnel assignments and 1995 criminal activity reports.**

- **In addition, decisions by the Mayor to require District Station police officers to inspect MUNI vehicles at least one ride per shift is a good mechanism for increasing 24-hour police officer presence on the system. Other initiatives to coordinate school related juvenile ridership with the SFUSD, and place civilian monitors on MUNI vehicles (including teachers and parents) are also positive crime prevention actions.**

- **Despite these efforts and a recent reported drop in criminal activity on MUNI vehicles, public perception that the Municipal Railway is unsafe continues.**

- **The City could increase public safety on MUNI vehicles, in stations and at stops by: (1) modifying Deployment practices related to district station, Juvenile Division, and MUNI transit Company operations; (2) increasing efforts to enhance rider awareness of safety and crime reporting; and, (3) adopting the best practices of other jurisdictions related to crime prevention and suppression in transit systems.**

The Department of Public Transportation presently contracts with the San Francisco Police Department (SFPD) for law enforcement services on MUNI vehicles and at MUNI stations and stops. MUNI pays the SFPD $1,050,000 per year for these services. However, the SFPD spends approximately $3.6 million for police officer staff assigned to a dedicated tactical unit referred to as the "MUNI Transit Company" (currently 50 sworn personnel); supplements the activities of the personnel assigned to this unit with approximately $543,500 of police officer overtime; and responds to all MUNI related service calls made by transit operators, station agents, and the public with officers from the Police District stations. In the past, police officers from the SFPD's Special Operations unit have also been used to supplement the services of the MUNI Transit Company.

Based on data compiled by the SFPD, criminal activity on MUNI began to increase during the latter six months of 1994. During this period, monthly "trouble reports" fluctuated between approximately 350 and 450 incidents.[1] Then, throughout 1995, the number of monthly trouble reports increased and remained consistently higher than in 1994. For the month of October 1995, the number of trouble reports reached an all-time high of nearly 600 incidents.

During this period, public attention began to focus on the high incidence of criminal activity on MUNI. In January 1996, the Mayor responded by requiring that all police officers within SFPD begin to inspect MUNI vehicles a minimum of once per shift (validated by the vehicle operator). In addition, the Mayor established a volunteer citizen monitoring program, and MUNI and the SFPD renewed efforts to work with the San Francisco Unified School District (SFUSD) to coordinate school release times so that interaction between juveniles from different schools and neighborhoods could be minimized.

Trouble Report Activity on MUNI

A wide range of criminal activity occurs on MUNI vehicles and at transfer locations, including: simple disturbances and malicious mischief; property crimes, ranging from fare evasion to grand theft; and person crimes such as robberies, and assaults on passengers and operators. Although this criminal activity occurs system-wide, patterns of concentration occur by time of day, location, and line. This concentrated activity has been recognized by MUNI and the Police Department, and efforts have been made by the MUNI Transit Company Captain to focus prevention and enforcement efforts in the most troublesome areas during periods when crime most likely occurs.

Recent Trouble Reports and Police Staffing Patterns

We analyzed trouble report activity by time of day for calendar year 1995. Based on this analysis, we were able to identify the periods when criminal activity is most likely to occur, and compare this activity with MUNI Transit Company staffing practices. The results of this analysis are shown on the chart on the following page.

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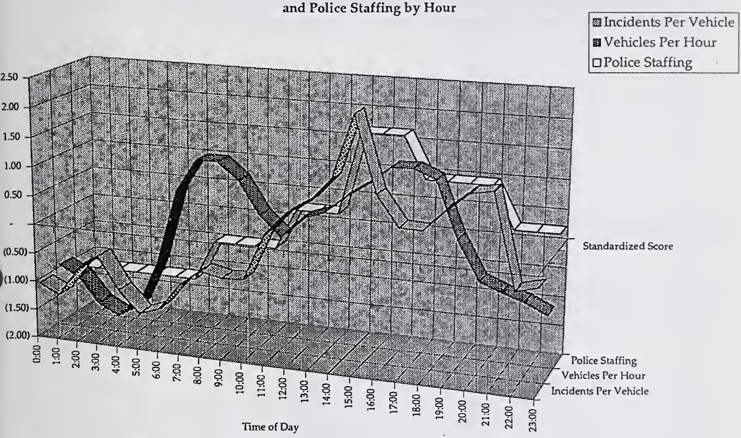
[1] MUNI trouble report statistics are compiled from daily activity reports, which are generated by MUNI Central Control records. Together, these documents currently provide the best profile of criminal incidents on board transit vehicles.

The chart compares three variables for weekday MUNI service: (1) the number of MUNI transit vehicles that were required by hour to provide scheduled service; (2) the number of trouble reports per vehicle, as reported by the MUNI Transit Company by hour; and, (3) the number of MUNI Transit Company police officers scheduled by hour.[2]

Exhibit 6.1.1

SF Municipal Railway
Analysis of Crimes to Vehicles
and Police Staffing by Hour



This data shows that, as expected, the number of MUNI vehicles required for service is greatest during the morning and evening commute hours. However, crime activity on MUNI vehicles is relatively low during the morning commute hours (measured as trouble reports per vehicle). Instead, trouble report patterns show rapid increases in crime during the early afternoon, reaching the highest level at approximately 3:00 PM. After 3:00 PM, crime activity begins to decline, but increases again in the early evening, until about 9:00 PM.

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[2] A Z-Score was computed for each independent variable to be used as a method of comparison. This standardized score is a statistical conversion which computes standardized units which can be used to compare unrelated data.

The SFPD's MUNI Transit Company scheduled staffing practices closely follow crime activity patterns aboard MUNI vehicles and at stations and stops. This staffing is appropriate given the current number of personnel assigned to the unit. Further, overtime is used to supplement scheduled staffing during periods when serious criminal activity occurs.

We also analyzed trouble reports by transit line and location within the City. The results of these analyses are shown in the following two tables.

Table 6.1.1

Analysis of Transit Lines Reporting the Highest Frequency of Trouble[a] San Francisco Municipal Railway - 1995

Transit Line	1995 Incidents	1995 Vehicle Hours Per Day	1995 Days Btwn Incidents
15	507	241.5	0.7
14	431	298.2	0.8
38	367	227.6	1.0
29	267	157.2	1.3
9	256	171.5	1.4
22	202	199.3	1.8
54	191	90.6	1.9
19	181	145.5	2.0
44	149	132.5	2.4
49	146	160.1	2.5

[a] As defined by average number of days of service betweeen incidents.

As illustrated in the table, there are three lines which experience an average of one trouble incident or more per day: Line 15, Line 14, and Line 38. These lines also carry some of the greatest numbers of riders within the MUNI system. In total, there are ten lines which experience an average of one trouble incident or more every 2.5 days.

An analysis of trouble reports by intersection shows a similar concentration of activity.

Table 6.1.2

Concentration of Trouble Report Activity By Police District San Francisco Municipal Railway - 1995/96

Police District	1995/96 Trouble Reports	Percent 1995/96 Trouble Reports
Mission	257	28.49
Ingleside	233	25.83
Potrero	116	12.86
Tenderloin	88	9.76
Northern	86	9.53
Southern	72	7.98
Park	33	3.66
Central	10	1.11
Taravel	4	0.44
Richmond	3	0.33
Total	902	100.0%

As shown, over one half of the trouble reports generated at MUNI stations and stops occur within two police districts -- Mission and Ingleside. Most of the recorded incidents occur along Mission and Market streets, at major transit intersections (e.g., Mission and 16th Street).

Deployment of police officers from the MUNI Transit Company varies depending upon crime activity and immediate deployment policies of the police administration. Uniformed police officers from this unit may visibly patrol trouble areas and lines, and plainclothes police officers may be deployed to particular trouble spots in order to reduce the occurrence of certain criminal activity (e.g., pickpockets). An informal mechanism exists to coordinate the activities of the MUNI Transit Company with the District Stations and other tactical units within SFPD.

Trouble Report Activity by Category of Incident

As mentioned previously, a wide range of trouble report activity occurs on MUNI vehicles and at stations and stops. This trouble activity ranges from simple disturbances, to serious crimes against persons, including assaults on drivers and passengers. The MUNI Transit Company has been compiling comprehensive data by category of trouble incidents for the last half of 1995 and the first quarter of 1996.

We analyzed this data to obtain a profile of the trouble report activity on MUNI for this recent nine month period.

To improve the usability of the trouble report activity data, we grouped it into four general categories:

1. Operator Involved Incidents: This category includes reported operator/passenger altercations, threats made to operators, and operator assaults. This category of trouble subjects employees of the MUNI to possible and real injury, which has been attributed by MUNI management to be one of the primary reasons for recent increases in Workers Compensation claims and lost work days for MUNI vehicle operators.

2. Person Crimes: This category includes homicides (as well as suicides and accidents)[3], assaults on passengers, sexual assaults on passengers, reports of shots fired, and robbery.

3. Property Crimes: This category includes fare evasion, graffiti, grand theft, pickpocket, and thefts of transfers.

4. Minor Crimes, Infractions, and Disturbances: This category includes false alarm calls from the operator, "insane" persons, intoxicated passengers (alcohol and drugs), malicious mischief, and disturbance.

The following table presents the results of this compilation.

Table 6.1.3

Trouble Incidents by Type
San Francisco Municipal Railway - 1995/96

Category	Nine Month Incident Count	Percent Incidents	Incidents Per Day
Operator Involved	581	15.1	2.1
Person Crimes	458	11.9	1.7
Property Crimes	711	18.5	2.6
Minor Crimes, Infractions and Disturbances	2,090	54.4	7.6
Total	3,840	100.0	13.9

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[3] No homicides on MUNI vehicles were reported during the period studied, although three accidents and suicides were reported and listed as homicides.

As illustrated, approximately 54.4 percent of all trouble report activity on MUNI is for minor crimes, infractions, and disturbances. However, an average of four to five person and property crimes are committed against passengers daily (30.4 percent of all trouble reports). An additional two incidents involving crimes and/or threats against drivers, and driver/passenger altercations occur daily (15.1 percent of all trouble reports).

It is very important to note that although most of the trouble reported on MUNI vehicles is not considered by the SFPD to be major crime, all such trouble has a significant impact on perceptions of safety held by the riding public. One high profile crime can become the cause of significant concern among riders, as can multiple "uncomfortable situations" experienced by some passengers who may share transit vehicles with large groups of loud and offensive riders. Further, trouble reports made to MUNI and SFPD may not provide a complete picture of criminal activity on transit vehicles. For many reasons, victims and witnesses of criminal activity may be reluctant to report incidents to the driver or to the Police Department.

It is also important to note that approximately 25 percent of the 1995 trouble reports compiled by the MUNI Transit Company were for incidents where juveniles were identified as either the perpetrators or victims of crime. Discussions with representatives of the SFPD Juvenile Division, as well as a review of previous year analysis conducted by SFPD, provides estimates that between 60 percent and 75 percent of the crime committed in San Francisco may be related to juveniles. Certainly these perceptions are supported with reported observations by MUNI operators and crime statistics which show high levels of criminal activity occurring immediately after school release time.

Summary Conclusions Regarding Criminal Activity on MUNI

Based on the analysis presented above, the following general conclusions can be drawn regarding criminal activity on MUNI vehicles, and at stations and stops.

- Although criminal activity on MUNI occurs during all hours, the highest weekday concentration of trouble occurs during two primary periods: (1) approximately 2:00 PM to 4:00 PM; and, (2) approximately 6:00 PM to 9:00 PM each afternoon and evening.
- Criminal activity occurs on some transit lines more frequently than on others. The lines with the most criminal activity include the 15, 14, and 38, which also have some of the highest ridership in the City. Trouble is reported, on average, more than once per day on these lines.

- Over 54 percent of the trouble reported on MUNI is for minor crimes, infractions, and disturbances. Approximately 15 percent of the trouble reports involve operators, either as the victims of assault or threatened assault, or in altercations with passengers.

- Criminal activity occurs at MUNI stops and stations primarily within the Mission and Ingleside Police Districts. These two districts experienced over 50 percent of the trouble reported at major transfer point intersections during the past year.

- Juveniles are identified as the perpetrators or victims of crime in approximately 25 percent of all trouble incidents reported by the MUNI Transit Company. However, this profile is probably understated since reporting depends on the perceptions of the individual making the report and the accuracy of the record. SFPD estimates that juveniles are involved in more like 60 percent to 75 percent of all criminal incidents in the City.

- The Captain of the MUNI Transit Company has appropriately assigned his police officer staff during the times of day when criminal activity is most likely to occur. Overtime is used to supplement regularly scheduled staffing when patterns of serious crime are most probable.

Given the average daily ridership of over 750,000 persons on MUNI, we generally conclude that the MUNI environment is statistically safe for most individuals who travel on the system. Instead, the public perception that MUNI is not safe may be due to an awareness of high profile incidents, and experience with "uncomfortable situations" involving large groups of loud and offensive riders.

Opportunities exist to improve MUNI safety and public perception by modifying police officer deployment practices, increasing public education and awareness, and adopting the best practices of other transit properties within the United States.

Opportunities for Improving MUNI Safety and Public Perception

During this study we accompanied police officers from the MUNI Transit Company on a uniformed beat which extended along the route of the 22 Filmore Line, south to Mission Street, and then along Mission Street on the 14 Mission Line between 8th Street and Geneva. During our observation, these officers would board buses, ride along for several blocks, and then disembark at major transit stops and transfer points known for trouble (e.g., Mission and 16th streets, Mission and 24th streets, Mission and Geneva streets, etc.).

No citations were issued or arrests made during the observation. However, the officers who were observed during this period interacted with passengers and drivers, were able to respond to a variety of citizen inquiries, and were able to stop minor incidents merely with their presence (e.g., illegal skateboarding on sidewalks). Although not verifiable, the officers commented on how they believe their uniformed presence acts as a deterrent to crime.

Deployment of SFPD Personnel

Concurrent with this analysis of security on the Municipal Railway, the Budget Analyst has been conducting a management audit of the San Francisco Police Department. Accordingly, we have been provided the opportunity to review the operations of SFPD and assess how the MUNI Transit Company operates within the Department.

Personnel assigned to each of the ten Police Districts are deployed into the following general categories:

- Sector Patrols: Officers are assigned to radio cars to patrol specific sectors of the City. These sectors can vary in size based on geography and population density.

- Beats: Officers are assigned to foot or bicycle beats, based on district characteristics, and the nature and extent of criminal activity in specific neighborhoods.

- Directed Enforcement: Officers may be assigned to plainclothes enforcement units which deal with specific, localized crime issues such as drug sales and use, vehicle burglaries, vehicle theft, etc.

- Support: Officers are assigned to the station; guard, transport, and book prisoners arrested within the District; manage the vehicle fleet and radio inventory; and conduct other activities to increase the effectiveness of patrol and beat officers.

- "Captain's Staff": Officers report directly to the station Captain for special duty, such as the processing of permits and service of subpoena. Nearly all districts assign officers from this group to "school cars". School car officers provide law enforcement services at all middle and high schools, working shifts that roughly correspond with school schedules.

In addition, the SFPD has a number of special and tactical units which support the district stations, including a City-wide Juvenile Unit which was assigned 33 sworn personnel in 1995.

We will be discussing police officer deployment practices of the SFPD in our management audit of the Police Department, which is scheduled for completion later this year. However, for purposes of this management audit, we are providing comments on modifications to current Department police officer deployment practices which we believe will enhance MUNI safety and security.

Three factors point to the need for District Stations to assume more direct involvement in juvenile and MUNI crime prevention and suppression.

(1) SFPD estimates that between 60 and 75 percent of all crime in San Francisco involves juveniles. At least 25 percent of all reported trouble on MUNI vehicles involves juveniles.

(2) The SFPD assigns police officers to school cars during and immediately after school. These officers become familiar with juveniles who are criminally active at the school; develop good lines of communication with school officials, probation officers, and in some instances, parents and family; and, have a direct link with command staff and police officers who are assigned to sector car and patrol beats within the District. However, these school car officers are generally transitioning off-duty when the students disperse onto MUNI and into the community.

(3) It has long been recognized, and statistics show, that crime on MUNI vehicles follows the transportation patterns of juveniles. Discussions with SFPD personnel and analysis of the data shows that trouble tends to concentrate during student transportation periods, on identifiable lines and at specific transit intersections.

As mentioned previously, MUNI, the SFPD, and the SFUSD are all collaborating on improved supervision of students during periods of transfer and travel on MUNI vehicles. Designated school trippers[4] have been assigned, school schedules are being modified to stagger release times and minimize student interaction, and civilian monitors (including teachers) observe boardings and some travel by students.

Nonetheless, SFPD should consider redeploying police officer personnel within the Department so that each District Station with a high concentration of schools, and/or student movement on MUNI, establishes juvenile officers whose shifts overlap those of the school car officers.[5] These juvenile officers should be made responsible for monitoring student activities as the students leave campus, wait at stops, and ride on Muni vehicles (school trippers and regularly scheduled lines). Juvenile officers should also be required to coordinate their activities with SFPD's Juvenile Unit so that problems which cross district station boundaries can be effectively addressed. In addition, foot beat officers within each district should be periodically diverted to major transit intersections during hours when juvenile crime is highest at these locations.

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[4] Additional transit vehicles that are dispatched for peak student travel periods.

[5] This proposal is consistent with an internal SFPD recommendation to establish one juvenile officer within each station.

The Captain from each district should also be required to compile statistics on prevention and enforcement activities on MUNI and at transit intersections within his/her assigned district. MUNI trouble report data should be regularly sorted, to the best of the Department's ability, by the district where trouble occurs -- even when such trouble occurs on a moving vehicle. As data becomes more refined, so should police officer deployment practices within the districts.

The SFPD is presently evaluating an internal proposal to establish one juvenile officer in each district station. However, no action on this proposal had been taken at the time of this report. We support this proposal in concept. However, based on available data and discussions with SFPD personnel, we believe that the Mission and Ingleside district stations should receive priority when making officer deployment decisions.

These recommendations to re-deploy officers at the District stations to become more directly involved in juvenile and MUNI crime activities should not be done at the expense of regular sector patrol and foot beat assignments. Instead, police officers should be assigned from throughout the Department based on an organization-wide staffing assessment. The Mayor should direct the Chief of Police to integrate juvenile and MUNI staffing needs into the current deployment plan being developed by the Department.

Increasing Public Awareness and Education Efforts

MUNI and the SFPD report regularly to City officials on crime activity on MUNI vehicles. Periodically, when major program changes occur, there may also be press releases generated by MUNI or the Mayor's Office regarding efforts being made by the City to prevent or suppress criminal activity on MUNI vehicles. Further, MUNI provides a telephone "tip line" number in several standard publications (e.g., the MUNI Timetable), and has produced special brochures on safety on MUNI vehicles (e.g., "Kids Ride Safe on MUNI", "MUNI Riding Tips for Seniors", and the "Graffiti Line"). Other programs, such as MUNI's "Special Stop" program also publicize the safety aspects of special programs designed for the convenience of riders.

MUNI and SFPD representatives also participate with citizens' groups such as SAFE (Safety Awareness For Everyone), and have regularly convened and participated in City task force groups such as the "San Francisco Organizing Project" which is intended to bring MUNI, SFPD, the San Francisco Unified School District, and other groups together to evaluate remedies to MUNI security issues. In partial response to the directive to develop low cost proposals for improving MUNI services, the Department initiated a Speakers Bureau which will provide speakers for schools and various civic organizations to speak on MUNI safety, and other matters.

All of these efforts are commendable. However, there have been only modest attempts at developing radio and television advertisements (public service announcements), bus posters, and other prominent advertisement intended to advise patrons on ways to avoid crime on MUNI, how to respond to threatening situations, and/or report incidents when they occur. Although the Community Affairs Unit, in conjunction with MUNI's safety manager, is presently developing some low cost advertising posters for buses, MUNI's advertising budget is not sufficient for producing and managing a safety advertising campaign of consequence.

We requested the Acting Director of Community Affairs to provide a proposal for a resource base for a crime awareness marketing effort. She developed a proposal which would:

- Reinstate two full-time positions, which currently remain vacant to contribute toward achieving the Department's salary savings target;[6]
- Increase MUNI's printing budget above current levels;[7]
- Add miscellaneous production and design costs estimated at approximately $42,600.

We believe this proposal provides a realistic assessment of MUNI's needs in this area. However, given MUNI's current budget and contribution requirement from the General Fund, the Department should explore alternative means of obtaining some advertising and promotion services and materials directed toward safety. For example, MUNI's current contract with Transportation Displays, Inc. (TDI), for which MUNI presently receives a minimum guaranteed payment of $2.2 million annually for ad space on transit vehicles and at Metro stations, provides the Department with:

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[6] These positions would also be used for other MUNI promotional campaigns.

[7] The Department included an increase in its printing budget of $63,000 in FY 1995-96 to $132,000 in FY 1996-97.

- $10,000 of creative design services per year through 1997-98;
- $60,000 per year of advertising space and/or advertising time on Bay Area electronic and print media, through 1997-98;
- $100,000 per year through 1997-98 to fund a professional public relations position and associated administrative expenses, to be used for the promotion of MUNI; and,
- The right to use any unsold or unused ad space.

The City also maintains a similar right to use any unsold or unused advertising space at transit stops and shelters under its current agreement with Gannett Outdoor Company, Inc. (the City receives a $150,000 minimum payment for advertising space under this agreement).

The contribution guarantees under the TDI and Gannett agreements provide a good mechanism for MUNI to initiate an expanded Crime and Safety Awareness Campaign. MUNI should approach the contractor with a mutually beneficial proposal to share in the cost of such a campaign in order to improve MUNI's image, and reduce the blight on board MUNI vehicles that is caused by graffiti, vandalism and other similar offenses. The contractor's share of the campaign costs could be provided in the form of non-cash contributions of professional talent, design, and production.

Further, this is a good area for MUNI to seek private contributions from private sector business. MUNI should develop and immediately implement a project to seek such contributions in the form of cash or services from local companies.

Once cash contributions or donated services are identified by the Department, the Director of Public Transportation should report to the Public Transportation Commission on additional City resources which may be required for a comprehensive Crime and Safety Awareness Campaign. Depending upon the Department's success in negotiating contributions from TDI and other businesses, and the characteristics of the proposed program, the Commission, the Mayor, and the Board of Supervisors should give the proposal favorable consideration.

Adopting the Best Practices of Other Transit Properties

During this study, we researched the library of the Metropolitan Transportation Commission (MTC) and surveyed several transit police agencies on current practices to address crime. Most of the methods included in the literature and practiced by these other jurisdictions have either been attempted in the past, or are currently being employed by MUNI. However, there are several which merit further consideration by MUNI and the SFPD, as follows:

- Orange County adopted a "zero-tolerance" policy for graffiti and vandalism, which included a program to identify juveniles who consistently "tag" bus windows. All graffiti was photographed and cataloged, analyzed by a handwriting expert, and detailed reports were generated by maintenance personnel to identify the run and day/time that the graffiti occurred. This information was then shared with police and the Probation Department to identify juveniles who regularly vandalized buses. The juveniles then received a warning from law enforcement personnel, or were cited. This program not only reduced the presence of graffiti, as has occurred in San Francisco with the current graffiti abatement program, but also reduced the incidence of graffiti. The Santa Clara County Transit District uses a similar program, and has developed a computerized "Tag ID" program to identify responsible juveniles.

- Long Beach Transit has a program where the local police will periodically saturate problem bus lines with plain clothes and uniformed officers, making sure to issue citations for all infractions and violations of rules, no matter how minor. By periodically making officer presence very apparent on problem routes, the incidence of crime in these areas has diminished.

- The Chicago Transit Authority (CTA) has initiated a program of retraining vehicle operators, with disability determinations on industrial injuries, to act as quality assurance specialists on transit vehicles. In addition to policing the vehicles for minor infractions and violations of rules, these employees monitor drivers on conflict avoidance and resolution techniques. This monitoring information is shared with the CTA's training division so that appropriate training can be provided to active drivers.

- Gardena Municipal Bus Lines has designed its transit facilities to provide space for the Los Angeles County Metropolitan Transit Authority (LACMTA) Police, who provide law enforcement services for the Gardena agency. Daily contact between police officers and route supervisors, coach operators, and bus maintenance personnel reportedly improves police officer effectiveness.

- New York City Transit, Alameda County Transit, and others have an aggressive program to provide public awareness of crime, safety on bus vehicles, and mechanisms for reporting crime.

These represent some examples of methods used by other transit properties to improve law enforcement, and increase public awareness and participation in crime prevention and reporting. MUNI and the SFPD should evaluate these programs for implementation in San Francisco, and continue to survey other jurisdictions to identify best practices used elsewhere.

It is important to note that safety on transit vehicles is a national concern. However, there is no central data base for evaluating relative safety between transit systems. The Federal Transit Authority (FTA) has recognized this, and is currently developing a system which will provide standardized measurement of criminal activity within transit systems. Once such a system is developed and operational, MUNI can use the data to identify properties with similar demographic and operating characteristics which show good performance. MUNI and the SFPD can then benchmark their operations against these properties, and determine whether these other properties have developed programs which successfully reduce the incidence of transit crime.

Conclusions

MUNI Transit Company police officers are effectively deployed given current SFPD personnel assignments and 1995 criminal activity reports.

In addition, decisions by the Mayor to require District Station police officers to inspect MUNI vehicles at least one ride per shift is a good mechanism for increasing 24-hour police officer presence on the system. Other initiatives to coordinate school related juvenile ridership with the SFUSD, and place civilian monitors on MUNI vehicles are also positive crime prevention actions.

Despite these efforts and a recent reported drop in criminal activity on MUNI vehicles, public perception that the Municipal Railway is unsafe continues.

The City could increase public safety on MUNI vehicles, in stations and at stops by: (1) modifying Deployment practices related to district station, Juvenile Division, and MUNI transit Company operations; (2) increasing efforts to enhance rider awareness of safety and crime reporting; and, (3) adopting the best practices of other jurisdictions related to crime prevention and suppression in transit systems.

Recommendations

The Chief of Police should:

6.1.1 Incorporate modified deployment policies to provide expanded juvenile and MUNI law enforcement capacity at the district stations, as described in this report.

6.1.2 With the Director of Public Transportation, evaluate the best practices of other transit properties for implementation in San Francisco. Adopt programs used at these other properties, as appropriate.

The Director of Public Transportation should:

6.1.3 Initiate a campaign to obtain private sector contributions for an expanded public Crime and Safety Awareness Campaign;

6.1.4 Direct the Acting Director of Community Relations to develop a proposal for a public Crime and Safety Awareness Campaign which incorporates contributed services from the private sector, and is at least partially funded from private donations.

6.1.5 With the Chief of Police, evaluate the best practices of other transit properties for implementation in San Francisco. Adopt programs used at these other properties, as appropriate.

Costs and Benefits

There should be no additional costs to redeploy police officers within the SFPD. Costs for implementing an expanded public awareness campaign and adopting best practices in other transit properties can not be determined until MUNI and the SFPD complete efforts to obtain private sector contributions, and evaluate the appropriateness of programs used by other transit properties for implementation in San Francisco.

Implementation of these recommendations will improve SFPD effectiveness at addressing juvenile crime on MUNI buses, and will increase public awareness and participation in crime prevention and reporting on MUNI vehicles and at stations and stops.

7. Contracting for Specific Routes

Proposition J required that the Budget Analyst identify opportunities for contracting specific routes. However, the budget for the management audit was not sufficient to permit a thorough assessment of the costs and benefits of contracting specific routes. Therefore, our efforts focused on steps which would need to be taken by MUNI to cost effectively contract for services, while maintaining service quality for passengers.

This section contains two findings. The first finding reviews general opportunities for contracting for service, assesses the private sector interest in contracting, and reviews the experience of other transit properties which currently have a contracting element for regular passenger service. The second finding reviews MUNI's opportunities for contracting with other adjacent transit properties for shared service either within the boundaries of San Francisco, or on specific routes to locations such as the San Francisco International Airport.

The details of these findings are discussed on the following pages.

7.1 Contracting for MUNI Service

- **Many transit agencies throughout the United States presently contract with private companies to provide passenger services. Our review of available literature, and of the experience of these other transit agencies, indicates that competitive contracting generally results in cost savings due to lower transit employee salaries and higher productivity work rules.**

- **However, the quality of service and the level of vehicle maintenance can be at risk under a contracting system. Also, some representatives of properties that use contract services have publicly reported that after the first several years of contracting, costs can begin to reach those that would have been incurred with an in-house program.**

- **Before considering potential contracting opportunities, the Mayor, the Board of Supervisors, the Public Transportation Commission, and MUNI management need to clearly define: (1) the criteria to be used for selecting routes and services to be contracted; (2) the controls that are needed to ensure continued service and maintenance quality; and, (3) a process that would ensure fair competition between MUNI employees and the private sector when evaluating proposals. Until these major policy issues are defined, the City should not pursue contracting opportunities for specific routes.**

The practice of contracting with private firms to provide public services is an old concept. In the late 19th century and the first decade or two of this century, public services--including public transit services--often were provided by private companies. Many transit agencies in the United States, including those in Denver, Los Angeles, San Diego, Seattle, and San Mateo County presently contract with private sector companies to provide a portion of their transit services. However, the reported results from these contracting efforts have been mixed, both in terms of savings and in the quality of services that are provided.

Available literature on contracting for transportation services is vast, but is also inconclusive about the advantages of using contract rather than publicly-owned services. One authority[1] on the subject states, "You can't write a textbook to say that one way of delivering public services is better than another. All you can do is look at individual circumstances to see what works."

MUNI'S Policies on Private Enterprise Participation

Section 6.1 of the Public Transportation Department's Short-Range Transit Plan (SRTP) cites two resolutions, Numbers 86-0103 and 87-0327, which were approved by the Public Utilities Commission (PUC). These two resolutions affirm the PUC's commitment to "fair and adequate consideration of the role of the private sector in providing transportation services...." The following section, contained in both resolutions, summarizes the Department's stated policy with regard to private participation in providing transportation and transportation related services:

> "WHEREAS, in the discharge of its responsibilities to provide cost effective services, the Public Utilities Commission:
>
> a) Is committed to sustaining an environment which provides opportunities for private sector involvement in the provision of transportation and transportation related services.
>
> b) Is committed to ensuring that the capabilities of the private sector are fairly and adequately considered in the provision of such services.
>
> c) Has a demonstrated record of private sector provision of various transportation and transportation related services."

PUC Resolution No. 87-0327 contains the following language, which provides direction to MUNI on the development of a process for identifying private sector and fixed-route contracting opportunities. This language is displayed below:

> "RESOLVED, That the Commission hereby directs the staff to undertake the following actions to maximize the cost effectiveness of MUNI's fixed-route service:
>
> - Develop a process by which the PUC can evaluate private provider opportunities.
> - Plan to start evaluating fixed-route opportunities in Fiscal Year 1988/89.
> - Develop an analysis of other productivity opportunities available to the MUNI (such as self-service fares, and greater use of high-occupancy vehicles)
> - Report to the Commission on each of these subjects by March 1, 1988."

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[1] Wesemann, H. Edward, former township manager of the Pittsburgh suburb of Mount Lebanon and the author of a how-to book entitled *Contracting for City Services* (Pittsburgh: Innovations Press, 1982).

Appendix 7.1.1 to this audit report is a side letter agreement between the San Francisco Municipal Railway and the Transport Workers Union Local 250A concerning "Privatization" which, according to the City Attorney's Office, is still in effect. The side letter agreement echoes the policies stated in the aforementioned PUC resolutions.

Implementation of Policy Directives

In response to the first directive contained in PUC Resolution No. 87-0327, MUNI developed Appendix E of the SRTP entitled "Procedures for Handling Unsolicited Proposals and any Resulting Complaints." However, these published procedures are incomplete and unnecessarily complicated.

For example, no contracting criteria has yet been developed by the Department, although Section E.1.3, "Evaluation," of Appendix E states, in part, that "The proposal will be evaluated using the contracting criteria to be developed and published by MUNI." Procedures currently state that until contracting criteria are developed, private sector proposals will be evaluated "according to policy guidelines included in the Short-Range Transit Plan."

However, these SRTP interim policy guidelines are not comprehensive and do not establish an environment that is conducive to contracting. Further, current policies do not identify areas of service that may provide the most advantageous contracting opportunities for the private sector, while enhancing the MUNI system of services. Such service areas could include:

- Supplementary service, such as that provided for sports events held at Candlestick Park;
- Rapid, short-distance service between designated City locations (e.g., between the hotel district and the Financial District/Moscone Convention Center);
- Long-distance express commuter service; or,
- Dedicated school service.

Until the goals, objectives, and parameters for contracting services are adequately defined, the potential benefits from contracting for services will remain elusive. Therefore, the Public Transportation Commission should direct MUNI management to identify service elements, and develop and present criteria that will encourage practical, cost effective contracting solutions for transit services. A report which clearly presents options available to the City should be provided to the Commission no later than three months after the acceptance of this management audit.

The Department also has developed a cost allocation model that can be used to compare MUNI costs to private sector costs, included as SRTP Section 6.1.4., "Costing Methodology." The model's stated capability includes that of being able to derive costs for specific services, such as transit routes.

However, MUNI's Deputy Director for Finance, Administration, and Personnel informed the Budget Analyst that the data in the costing model has not been updated since FY 1992-93, which was the last year that a private sector proposal was evaluated. The Budget Analyst requested a copy of that most recent evaluation of this private enterprise proposal, but was not provided a computer demonstration of the costing model, and one was provided. However, the staff person demonstrating the model was not thoroughly familiar with the model's attributes and operation, and stated that the costing model is "completely useless."

MUNI should update and utilize the model to determine those routes most suitable for contracting on a cost basis. This information should be integrated with the Department's assessment of contracting criteria, by type of service, discussed above.

Current Extent of Private Contracting

MUNI currently contracts for many transportation and transportation-related services. However, the only contract to provide direct passenger services is for paratransit services, which costs MUNI approximately $10.7 million per year. The major transit-related service contracts used by MUNI are listed in the table below:

Table 7.1.1

Major Transit Related Service Contracts San Francisco Municipal Railway - 1996

Contractor	Service Provided	Annual Contract Amount
Atlas Tow	Towing Buses	$ 175,288
Burns International	Security Services	1,341,588
BART	Fast Past service on BART	3,230,163
BART	Joint Elevator Maintenance	897,373
Cerenio	Paratransit Service	10,654,201
Total of Major Contracts		$16,298,613

Competitive Contractor Perspectives

In order to determine the interests and concerns of prospective private contractors, we met with Howard Wallack, principal in the firm of Transportation Sector Consultants who represents private businesses that are interested in contracting to provide public transportation services. One of Mr. Wallack's clients is Grosvenor Bus Lines (better known as Gray Line in San Francisco) that provides contract transit services to SAMTRANS in San Mateo County. Mr. Wallack expressed to us his views on competitive contracting philosophy and methodology, operating policies, and benefits. He also provided information concerning salaries and benefits of private enterprise employees, and how private sector operating rules differ from the public sector in order to obtain economies and efficiencies.

Mr. Wallack stated that completely replacing a property's public sector service with private enterprise service has not been successful in other locations, primarily because private companies that enjoy a monopoly eventually raise costs and service begins to deteriorate due to a lack of competition. He believes that any contract for existing services currently provided by MUNI workers should be incrementally implemented at a rate commensurate with worker attrition, in order to avoid unnecessary layoffs of MUNI employees. He further stated that he believes a transit agency's most costly lines should be contracted first, leaving the services with the lowest net cost to be operated directly by the public agency.

Mr. Wallack described his suggestions for a process for identifying specific routes suitable for contracting, as follows:

1. Select the type of service for potential contracting, including fixed route, commuter express, local, or demand responsive services (see examples, above). Generally, select services that require the largest subsidy per revenue hour.

2. .Determine costs for the type of service selected for potential contracting--direct, indirect, and overhead costs--by transit line. Transit line costs vary according to ridership and other factors. This analysis would yield those lines that have the highest operating costs and subsidies per passenger.

3. Rank the transit lines from the most expensive to the least expensive.

4. Select those transit lines that are most suitable for contracting. Generally, the most expensive lines should be selected.

5. Develop a Request for Proposal (RFP) to provide flexibility to evaluate factors other than price.

6. Encourage community-based transit companies to participate in the RFP process. Transit agencies have found that by encouraging community-based participation, better prices and more responsive services can be obtained.

Competitive Contracting Experiences of other Agencies

As part of this study, we talked directly to the major transit service providers in the City of Denver, and the counties of Los Angeles and San Mateo (all of which presently contract for a portion of the service they provide). Each of these properties reported that their overall operating cost was reduced by implementing a competitive contracting environment for a portion of their service. However, the agencies were reluctant to provide any specific dollar amounts or cost savings percentages because of the significant problems associated with selecting a costing basis and measuring such savings.

All of the agencies reported that their cost savings were due to significantly lower driver salaries, as low as approximately 60 percent of the public service operator salaries, and to enhanced productivity due to less rigid work rules. However, public statements made by some officials from these properties stated that after the first several years of contracting, costs can approach those that would have been incurred with an in-house program as private sector salaries escalate.

These representatives also stated during interviews that although the quality of service provided by their contractors was from satisfactory to excellent, none believed that service to be superior to what is presently provided directly by their agency.

The contacted agencies also reported that the safety records of the contractors were comparable to, or perhaps slightly less than those of the publicly provided services. However, without strong contract oversight, a contractor's services can present potential safety questions. Employee screening, safety training, and other factors which can impact system safety can become lax unless there is regular vigilance by the contracting transit agency.

The contacted agencies all used positive and negative contractual incentives to enhance services. For example, San Mateo County, which rated its contractor service as outstanding or excellent, has a set of service incentive and penalty clauses included in its contract with Grosvenor. Under that contract, a contract transit vehicle that is running two or more minutes ahead of schedule results in a $1,500 penalty charge to Grosvenor.

Contracting Opportunities in San Francisco

Our directive on this study was to identify specific routes which could be contracted with the private sector. However, identifying routes which are the most costly for MUNI to operate, are supplemental to regularly scheduled service, can be easily segregated from regular service (e.g., express service or designated school services), or which would be most attractive to the private sector to operate would not have been meaningful without clear policy direction on contracting from the City. In other words, any evaluation of contracting opportunities raises significant policy and labor relations questions which must first be defined by City policy-makers before reasonable recommendations on contracting for specific routes can be made.

Competitive contracting opportunities fall into one of several general categories, as defined below:

1. Existing fixed route service:	The City could contract for existing fixed route service, based on an analysis of the net cost of operations and other factors related to service characteristics.
2. Supplementary Service:	The City could contract for supplementary service which is presently provided by MUNI, such as the service added for sports events at Candlestick Park, the Pier 39 Underwater World (Line 32) supplemental service, and dedicated student transportation.
3. New fixed route service:	The City could contract for new fixed route service that may be added to the system to meet changes in rider demand.

Some MUNI personnel with whom we discussed competitive contracting opportunities expressed the opinion that it would be beneficial to the City to contract for the supplemental service to Candlestick Park. The current integration of this supplementary service into regular transit schedules often impacts MUNI's ability to meet the regular PM peak service on game days.

Not surprisingly, competitive contracting for transit services is a controversial topic. Union officials with whom we discussed the subject are strongly opposed to the practice, and view it as a scheme to reduce City costs at the expense of the workers. Other arguments against competitive contracting contained in literature on the subject are summarized below:

1. Inaccurate accounting methods are sometimes used to exaggerate expected cost savings from contracting. For example, use of a "fully allocated cost" model, which requires the allocation of a portion of overhead costs to incremental competitive contract projects is sometimes used to distort cost comparisons with private sector services.

2. Contractors will sometimes "low-ball" a bid in order to win a contract and then attempt to raise the price through contract amendments, or when re-bidding, if the competition is viewed as being weak.

3. The emphasis with contracting is on cost containment, not service. The transit agency can lose some control over its transit service, and the riding public is left with little recourse but to accept the service that is provided.

4. The wages of the contractors' transit operators and other employees are often lower than what might otherwise be paid by the public sector. According to some assertions, private transit operators may not provide basic benefits, such as health insurance.

5. Contracts often require a strong system of monitoring and oversight. The somewhat "hidden" aspects of providing transit services (such as employee screening and training) may be neglected unless there is regular vigilance by the contracting transit agency.

Contracting for services can be successfully implemented if clear policies and criteria for contracting are defined; appropriate procedures, controls, and oversight mechanisms are developed; and, a process is developed to ensure fair competition between public sector employees and the private sector when evaluating proposals. Until these aspects of a successful contracting program are fully developed, extensive contracting for specific MUNI routes and services should not occur.

Conclusions

Many transit agencies throughout the United States presently contract with private companies to provide passenger services. Our review of available literature, and of the experience of these other transit agencies, indicates that competitive contracting generally results in cost savings due to lower transit employee salaries and higher productivity work rules.

However, the quality of service and the level of vehicle maintenance can be at risk under a contracting system, according to representatives of other properties which utilize such services. Also, these individuals report that after the first several years of contracting, costs can begin to reach those that would have been incurred with an in-house program.

Before considering potential contracting opportunities, the Mayor, the Board of Supervisors, the Transportation Commission, and MUNI management need to clearly define: (1) the criteria to be used for selecting routes and services to be contracted; (2) the controls that are needed to ensure continued service and maintenance quality; and, (3) a process that would ensure fair competition between MUNI employees and the private sector when evaluating proposals. Until these major policy issues are defined, the City should not pursue contracting opportunities for specific routes.

Recommendations

The Public Transportation Commission should:

7.1.1 Direct the Director of Public Transportation to identify service elements, and develop and present criteria that will encourage practical, cost effective contracting solutions for transit services.

7.1.2 Require that MUNI management submit a report to the Commission, no later than three months after the acceptance of these management audit recommendations, that clearly presents potential service elements, selection criteria and quality controls appropriate for a contracting program.

7.1.3 Direct the Director of Public Transportation to update and utilize the transit service costing model previously implemented by the Department to aid in identifying routes and services to be considered for contracting.

7.1.4 Direct the Director of Public Transportation to establish a process to ensure fair competition between public sector employees and the private sector when evaluating proposals.

Costs and Benefits

There are no costs associated with these recommendations.

By implementing these recommendations, MUNI will be better positioned to determine whether or not the implementation of a contract service program would result in cost savings, and whether service quality and safety would be maintained.

7.2 Coordinating Inter-Jurisdictional Service

- **The Golden Gate Bridge, Highway and Transportation District, AC Transit, and SAMTRANS provide passenger service within the City and County of San Francisco which, in part, duplicates service provided by the Municipal Railway.**

- **While the current level of service of these transit properties is needed during the AM and the PM peak hours, excess capacity is available during the middle of the day and evening hours. Municipal Railway lines, some of which partially duplicate this service, also have excess capacity during the middle of the day and evening hours.**

- **The Municipal Railway should work with the adjacent transit properties to provide coordinated service at reduced cost during non-peak hours. Agreements with these adjacent transit properties would allow MUNI to adjust schedules to provide the same or an increased level of services to commuters within the City limits. The savings to the other transit properties would be shared with MUNI either through revenue transfers, or by the other property assuming direct responsibility for providing equivalent or improved service on existing MUNI lines.**

Alameda County (AC) Transit, San Mateo County Transit (SAMTRANS), and Golden Gate Bridge, Highway and Transportation District (GGBHTD) all provide commuter express and special services within the City limits of San Francisco. These buses operate on major routes, dropping-off and picking-up passengers who wish to travel to and from neighboring counties.

The California State Senate is currently considering legislation (SB 1474) which would authorize the MTC, in consultation with the region's transit operators, to address service coordination and effectiveness in corridors of regional significance. The objective of this legislation would be to reduce duplicative and redundant service, and to institute coordinated service across district boundaries.

Such efforts to coordinate service have been made in past years without success. For example, in 1985 MUNI and SAMTRANS began exploring the feasibility of developing a regional trunk line which would extend service on the MUNI 28 line to the San Francisco Airport (SFO). The proposal would have restructured the SAMTRANS Line 3B to avoid duplication of service. Although this proposal was an opportunity to provide more coordinated and improved service, the increased cost to MUNI would have been in excess of $1.0 million annually, offset by only $300,000 in farebox revenue. This proposal has never progressed. When last suggested in 1990, neither SAMTRANS nor MTC agreed to fund any of the increased cost to MUNI.

Since the opening of the Colma Bay Area Rapid Transit (BART) District station SAMTRANS has reduced service from the Daly City BART station to the SFO and now provides shuttle service from the Colma BART station to SFO. These changes require some San Francisco passengers to transfer to BART at Daly City and then transfer to the SAMTRANS shuttle before arriving at SFO. While BART ultimately is to be extended to SFO, as an interim measure consideration could be given to extending the MUNI Line 28 to the Colma BART station. The cost of improved service and/or reduced cost to SAMTRANS should be shared with MUNI either through revenue transfers, or by SAMTRANS assuming the responsibility for providing equivalent service on an existing MUNI line. Such revenue sharing agreements would be similar to the inter-modal transfers which presently exist between MUNI/BART and MUNI/CalTrain, and would be consistent with MTC's objective to improve coordination of service within the region.

Although service by adjacent transit properties within San Francisco is convenient for the residents of these adjacent counties, there can be confusion among San Francisco MUNI riders since inbound buses from these other properties do not generally pick up passengers. Also, some of the service offered by these other properties duplicates that which is already provided by MUNI. While much of this service terminates after the PM peak, limited service by adjacent transit properties on nine lines make a total of 63 scheduled round-trips to and from downtown San Francisco each weekday after 8:00 PM, as follows:

Exhibit 7.2.1

Service Provided by Adjacent Transit Properties After 8:00 PM Within the City and County of San Francisco

Transit Property	No. of Lines	No. of Trips
AC Transit	4	35
GGBHTD	3	18
SAMTRANS	2	10
Totals	9	63

- AC Transit makes a total of 35 scheduled trips which terminate at the San Francisco Transbay Terminal after 8:00 PM each weekday.

- The GGBHTD makes a total of 14 trips to Civic Center and the San Francisco Transbay Terminal with several stops along the way and 4 trips which service Geary Blvd.

- SAMTRANS has two lines making a total of 10 scheduled trips to the San Francisco Transbay Terminal after 8:00 PM each weekday. SAMTRANS Line 7B runs essentially parallel to the Municipal Railway Line 9 within San Francisco; SAMTRANS Line 7F comes into San Francisco on Route 101 and also runs parallel to SAMTRANS Line 7B, and the MUNI Line 9 along Potrero Avenue into downtown San Francisco.

Many of the off peak trips by adjacent transit properties carry a very limited number of passengers at the same time that MUNI transit vehicles have excess capacity.

Within each transit system certain lines are changed after the PM peak to achieve operational efficiencies. For example, the GGBHTD merges their Number 10 Line with their Number 20 Line after the PM peak in Sausalito, and only the merged Number 10/20 Line continues on to downtown San Francisco. Consolidating these two lines after the PM peak allows the GGBHTD to accommodate passenger service demand at less cost than continuing two individual lines into San Francisco.

Similarly, opportunities exist to improve schedule coordination of the service offered by these other transit systems with services provided by MUNI. For example the MUNI Line 9 runs largely parallel to SAMTRANS Line 7B, serving Bayshore Boulevard and Potrero Avenue into downtown San Francisco. By adjusting the schedules to have common stops and routes, these two lines could be merged after the PM peak from Visitation Valley into downtown San Francisco. This arrangement would allow both MUNI and SAMTRANS to slightly increase headways, and thereby service, with the combined route.

Conclusions

The Golden Gate Bridge, Highway and Transportation District, AC Transit, and SAMTRANS provide passenger service within the City and County of San Francisco which, in part, duplicates service provided by the Municipal Railway.

While the current level of service of these transit properties is needed during the AM and the PM peak hours, excess capacity is available during the middle of the day and evening hours. Municipal Railway lines, some of which partially duplicate this service, also have excess capacity during the middle of the day and evening hours.

The Municipal Railway should work with the adjacent transit properties to provide coordinated service at reduced cost during non-peak hours. Agreements with these adjacent transit properties would allow MUNI to adjust schedules to provide the same or an increased level of services to commuters within the City limits. The savings to the other transit properties would be shared with MUNI either through revenue transfers, or by the other property assuming direct responsibility for providing equivalent or improved service on existing MUNI lines.

Recommendations

The Director of Public Transportation should direct MUNI staff to:

7.2.1 Review all transit services provided by adjacent operators to identify duplication of service and mutually beneficial changes in schedules that would provide the same or an increased level of services at reduced cost.

7.2.2 Work with these adjacent transit properties and the Metropolitan Transportation Commission to coordinate service which would result in cost savings that could be shared by each property.

Costs and Benefits

There would be no increased cost to implement these recommendations.

Implementing these recommendations would provide improved service at reduced cost for the citizens of San Francisco and adjacent communities.

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway Prepared for the Board of Supervisors City and County of San Francisco

Task	Description	Hours
1	**Entrance Conference and Data Collection**	
1.1	Conduct an entrance conference with the Director of Public Transportation and other Municipal Railway (MUNI) managers. Introduce the management audit team. Describe the management audit scope, procedures, and protocol, and respond to questions from Department managers. Request and obtain information Department managers believe should be immediately provided to the management audit team.	10
1.2	Review background information provided by the Department and collected from other sources, including other City and County departments, the Metropolitan Transportation Commission (MTC), and other agencies. Review and assess this information.	40
	Task 1 Hours Subtotal	50
2	**Improved Service and Scheduling [Proposition § (c) (1)]**	
2.1	Conduct a limited review of MUNI Operations, by mode of service, to determine method of operation, hours of service, scheduling, and ridership. Review and analyze available MUNI statistics to identify impacted routes. Collect information on missed service due to operator unavailability, equipment failure and other factors (e.g., traffic congestion during peak commute hours). Review the MUNI's efforts to communicate and coordinate services with other Bay Area transit operators. Determine opportunities for improving service by mode of operation through route restructuring and other means.	200

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway (Continued)

Task	Description	Hours
2.2	Conduct a limited review of vehicle and right-of-way maintenance activity (e.g., cable, electric overhead wire, shelters/stops, etc.) by mode of operation. Identify major maintenance issues which impact the ability of MUNI to deliver on-time and reliable service. Develop recommendations for improving maintenance services.	100
2.3	Evaluate MUNI's capital projects management and budgeting process. Included in this analysis will be an evaluation of the benefits to be achieved from the Automatic Train Control (ATC) system and the Turn-back projects currently being implemented by MUNI.	40
	Task 2 Hours Subtotal	**340**
3	Increasing Cost Efficiencies **[Proposition § (c) (2)]**	
3.1	Review the impact on operating and maintenance costs which may result from the scheduling practices of the Department, including opportunities for modifying the number of platform hours required to provide current service levels. Evaluate the use of overtime to meet operator scheduling needs. Review the impact of City and County funding policies on the ability of MUNI to provide on-time and reliable services. Determine the impact work rules have on scheduling, service delivery, and costs.	180
3.2	Conduct a limited review of MUNI's sick leave and workers compensation controls, including the effectiveness of the Department's incident reporting and monitoring systems, return-to-work programs, safety training programs, and implementation of corrective action on identified causes of injury.	100

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway (Continued)

Task	Description	Hours
3.3	Conduct a limited review of MUNI supervision practices to determine whether supervisory positions have been appropriately staffed, and whether supervisors are provided with sufficient authority and tools for effectively supervising their units. This evaluation will be performed in view of current requirements of collective bargaining agreements and the Charter.	40
3.4	Conduct a limited review of the controls over the collection, receipt, and deposit of farebox revenues. Evaluate the impact of MUNI's transfer policy on farebox revenues.	40
	Task 3 Hours Subtotal	**360**
4	Selling of Surplus Assets **[Proposition § (c) (3)]**	
4.1	Review documentation of previous and current efforts to dispose of surplus assets, including real property and facilities. Identify current assets using existing MUNI reports (assumes an accurate inventory of fixed assets exists). Analyze data contained in the inventory reports to determine the type, quantity, age, condition, and value of currently owned equipment. Conduct interviews with responsible MUNI employees to assess the accuracy of reports.	80
4.2	Categorize assets to determine which equipment and real property may be appropriate for disposal. Review available records regarding the current and planned use of existing equipment and real propertys. Determine an estimated sale value for identified assets. Evaluate whether MUNI's property disposal policies are appropriate, and applied in practice.	40
	Task 4 Hours Subtotal	**120**

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway
(Continued)

Task	Description	Hours
5	Acquisition Plans for New Equipment **[Proposition § (c) (4)]**	
5.1	Review MUNI's plans for new and replacement equipment (primarily rolling stock). Evaluate the process used by the Department to assess the condition of existing equipment and the impacts from service changes in order to define such need.	60
5.2	Conduct a limited assessment of historical costs and funding sources for the purchase of new equipment. Determine whether MUNI aggressively pursues receipt of grant funds from other agencies for the purchase of new and replacement equipment.	40
5.3	Determine whether MUNI has fully considered operating needs, the condition of existing equipment, new technologies, and the availability of funding when developing plans for new equipment acquisition. Determine the adequacy of these plans, and make recommendations for improvements.	40
	Task 5 Hours Subtotal	**140**
6	Salaries and Employee Benefits **[Proposition § (c) (5)]**	
6.1	Review salary survey documentation for previous years which is maintained by the Civil Service Commission. Collect salary and benefit changes for MUNI employees since the last reported salary and benefit comparison with major transit service providers in the United States.	40
6.2	Interview management and employee group representatives to obtain their perspectives on salaries and benefits paid to MUNI employees. Review current collective bargaining agreements with major employee groups, and review representative compensation profiles by employee classification (e.g., operators, mechanics, electricians, etc.). Determine how existing work rules impact the cost of services.	80

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway (Continued)

Task	Description	Hours
6.3	As appropriate, determine whether MUNI employees are paid in accordance with applicable Charter requirements related to industry benchmarks.	40
	Task 6 Hours Subtotal	**160**
7	**Safety of Passengers and Drivers [Proposition § (c) (6)]**	
7.1	Compare MUNI's existing safety plan with the safety plans of two other transit operators selected on the basis of standardized passenger and driver safety performance. Develop a matrix which illustrates the major elements of the safety plans received from the other agencies. Determine whether any areas are missing from MUNI's plan.	80
7.2	Evaluate driver safety performance, in relation to federally established safety guidelines. Evaluate MUNI's success with implementing its safety plan. Review MUNI operations to ensure that the provisions of the safety plan are being implemented.	40
7.3	Review reports on the incidence of criminal activity on MUNI vehicles, and at stations and stops. Evaluate MUNI's recent efforts to reduce the incidence of criminal activity affecting the safety of passengers and employees. *(NOTE: This task will be coordinated with the Management Audit of the Police Department, currently being conducted by the Budget Analyst).*	60
	Task 7 Hours Subtotal	**180**

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway (Continued)

Task	Description	Hours
8	Contracting Out Specific Routes **[Proposition § (c) (7)]**	
8.1	Review existing contracts for passenger services, including contracts for paratransit and other specific service modes. Obtain and evaluate passenger service contracts in surveyed jurisdictions (Task 1.4--however, the survey may be expanded to include major municipalities which supplement services provided by local transit agencies in other jurisdictions). Determine types of services currently contracted by MUNI and by other jurisdictions. Compare broad range estimated contract versus in-house costs for providing the identified services.	80
8.2	Develop selection criteria and identify routes that could be contracted. Identify opportunities for expanding service through contracting, such as expanded shuttle routes from BART, CalTrain, large employment centers, and hotels or conventions. Estimate the cost for these contracted services, and develop recommendations for potential implementation.	120
	Task 8 Hours Subtotal	**200**
9	Draft Report Preparation and Exit Conferences	
9.1	Prepare the draft management audit report and submit the draft report to the department for review.	160
9.2	Conduct an exit conference with the Director of Public Transportation and Municipal Railway management to review the report for factual correctness and clarity.	15
9.3	Modify the report, as appropriate, and produce a final report for submittal to the Board of Supervisors, the Mayor, and the Transportation Commission.	10
	Task 9 Hours Subtotal	**185**

Limited Scope Workplan to Perform a Management Audit of the Municipal Railway
(Continued)

Task	Description	Hours
10	**Final Report Presentation and Consultation**	
	Attend Transportation Commission public hearings to present and discuss the final report. Consult with the Transportation Commission on the development of an action plan to be submitted to the Mayor and the Board of Supervisors. Present the report to the Board of Supervisors, as required.	30
	Task 10 Hours Subtotal	**30**
TOTAL PROJECT HOURS		**1,765**

Property	Call Name	Transit Modes	1995 Annual Unlinked Pass Trips*	Vehicles Operated In Max Service	Basic Organization Structure	Major Divisions	Vehicle Custodial Services	Vehicle Light Maintenance	Vehicle Heavy Maintenance	Facilities Maintenance
Los Angeles	MTA	LR, MB	390,489	1,948	Mode/Region	Bus Regions	Integrated	Integrated	Separate	Separate
						Rail Operations				Separate
Philadelphia	SEPTA	LR, MB, TB	213,400	1,255	Mode/Region	Subway/Elevated	Integrated	Integrated	Separate	Separate
						Surface				Separate
						Suburban				Separate
Boston	MBTA	LR, MB, TB	209,342	950	Mode	Subway Operations	Integrated	Integrated	Separate	Separate
						Bus Operations				Separate
New Jersey	NJT	LR, MB	126,120	1,612	Mode	Bus Operations	Integrated	Integrated	Separate	Separate
						Rail Operations				Separate
Seattle	Seattle-Metro	LR, MB, TB	79,253	939	Function	Transit Operations	Separate	Separate	Separate	Separate
						Vehicle maintenance				Integrated
Pittsburg	PAT	LR, MB	72,754	777	Function	Transit Operations	Separate	Separate	Separate	Separate
						Road Operations				
						Rail/Support				Separate
San Francisco	MUNI	LR, MB, TB	210,361	757	Function	Operations	Separate	Separate	Separate	Separate
						Maintenance				Integrated

* For listed modes only.

Appendix 1.4.1

Transit Service Inspectors
Fixed and Mobile Post Weekday Coverage

Fixed Post Location & Total Hours of Weekday Coverage	# of & Lines of Pass	Radio Car District Number of Hours Individual Inspector Coverage	Actual Hours of Coverage
1. Market -4th (8*)	14	1-T-60 = Downtown North (16)	0600-2200
2. West Portal (16)	5	1-T-61 = Downtown South (16)	0500-2100
3. Embarcadero (32)	5	1-T-62 = Western Add./Marina (19*)	0700-0200
4. Market-SVN/11th (8*)	11	1-T-63 = Middle Mission (19*)	0700-0200
5. Union-Columbus (11)	5	1-T-64 = Outer Richmond (16)	0600-2200
6. Church-Duboce (11)	3	1-T-67 = Bayview/Outer Mission (16)	0600-2200
7. Mission-30th (11)	5	1-T-68 = North Beach/Wharf (8)	0900-1200 1500-2000
8. Transbay Terminal (11)	11	1-T-70 = N. Sunset/Haight S. Fillmore (16)	0400-2000
9. Calif.-Presidio (11)	6	1-T-71 = S. Sunset/WP/Ingleside (16)	0600-2200
10. Arleta-Bayshore (11)	6	1-T-80 = City-wide Owl (North Primary) (8)	2100-0500
11. Geary-Presidio (6)	3	1-T-81 = City-wide Owl (South Primary) (8)	2300-0700
12. Caltrain Depot (8*)			
13. Jackson-Mason (16)	2		
14. Geneva-Mission (2)	8		
15. 16th-Bryant (3)	4		
16. Geary-Park Presidio (2)	4		
17. Davis-Pine (2.5)	8		
18. Cyril Magnin-Market (2)	3		
19. Union-Steiner (2.5)			

(8*) = Split shift: 0700 to 1800 with split generally of 1000 a.m. to 1300 p.m.
(11) = Split shift: 0700 to 1800 with split covered by another supervisor.
(8) = Single; (8*) = Single w/Split not Covered; (19) = Double w/Split Covered; (16) = Double

Appendix 1.4.2
Page 1 of 2

MUNI
SAN FRANCISCO MUNICIPAL RAILWAY - CHIEF INSPECTOR'S OFFICE
2500-MARIPOSA STREET, SAN FRANCISCO, CA 94110-1425 - (415) 554-9286 / FAX (415) 554-9902

10 April 1996

To: Stan Jones
MUNI Audit Team

From: Art Curtis
Chief Transit Control Inspector

Subj: **HOW MANY INSPECTORS DOES MUNI REALLY NEED??**

As you know, we had almost 100 Inspectors in 1983 and we have 61 now. I don't think we needed 100 then or now because of the duplication that resulted by having three different operational groups with Inspectors assigned to them. When the "Clean & On-Time" Program" of 1992 was in effect, we were assigned an additional 15 Inspectors, which allowed us to do a much better job. But I felt that 15 was not quite enough to do the job the way we really needed to do.

My gut feeling is that we could do a first class job with 85 Inspectors. This would allow for reduction in the geographical size of radio car districts for better coverage and provide additional fixed posts, including more double shifts for important locations (vice split shift coverage) and more Saturday & Sunday coverage. It could also allow assigning some Inspectors collateral duties as a "Service Evaluation Team" for concentrating on problem lines on a rotational basis to discover and make recommendations for solving service reliability problems. One Inspector could be assigned a collateral duty to conduct new and refresher training to department personnel, particularly when new equipment is coming on line and when new policies and procedures are to be implemented. One Inspector would continue to be the Assistant to the Chief Inspector.

In essence, I would envision doing the following with 24 additional Inspectors:

1. Increase the number of radio car districts from 9 to 11.
2. Provide fixed post coverage at the following locations (a combination of existing and desired locations with actual hours of coverage to be determined according to service demand and after making a "shift cut" based on available personnel (A very time consuming process).

EXISTING FIXED POSTS

((Some full-time (split shift or 8 hrs straight / some part-time (AM and/or PM peak only) - *not in priority order*)):

Transbay Terminal
Market & 4th
Market & South Van Ness

Cyril Magnin & Market
Davis & Pine
Jackson & Mason

Mission & 30th
Geneva & Mission
Arleta & Bayshore
CalTrain Depot
Geary & Park Presidio
Geary & Presidio
California & Presidio
Union & Steiner
West Portal
Church & Duboce
Embarcadero Station
16th & Bryant
Fillmore & Sacramento
Union & Columbus

PROPOSED ADDITIONAL FIXED POSTS

((Some full-time (split shift or 8 hrs straight / some part-time (AM and/or PM peak only) - *not in priority order*)):

33rd & Geary
Sutter & Fillmore
19th & Holloway
Ferry Terminal
Forest Hill Station
18th & Castro
Union & Van Ness
Post & Polk
6th & Fulton
Haight & Masonic
Glen Park BART Station
Balboa Park BART Station
Sunset & Noriega
Beach & Hyde
Bay & Taylor

The combination of existing and proposed fixed posts is actually a compilation of just about all the fixed posts we have had at some time in the past and which provided extensive coverage of most MUNI lines.

Appendix 1.4.3

SAN FRANCISCO MUNICIPAL RAILWAY - CHIEF INSPECTOR'S OFFICE
2500-MARIPOSA STREET. SAN FRANCISCO, CA 94110-1425 · (415) 554-9286 / FAX (415) 554-9902

10 April 1996

To: Stan Jones
MUNI Audit Team

From: Art Curtis
Chief Transit Control Inspector

Subj: **COMMENTS ON THE "CLEAN & ON-TIME PROGRAM" OF 1992**

The "Clean & On-Time Program" was a temporary program in 1992 with the specific goals of eliminating grafitti from MUNI vehicles and improving the on-time performance of MUNI revenue vehicles. For the "on-time" portion of the program, 15 additional Transit Inspectors were hired and trained for a six month demonstration program. This allowed us to fill additional fixed post locations on either a 5 day or 7 day week basis, depending on service levels. As now, we attempted to place Inspectors at locations where several lines passed by, thus allowing for maximum coverage.

The additional corners filled during this program were Market & South Van Ness (*), h & Castro, Sutter & Fillmore, Geary & Presidio(*), Ferry Terminal, Arleta & Bayshore(*), Geneva & Mission, Sunset & Noriega (AM Peak only), 6th & Fulton, California & Presidio (weekend coverage added to existing weekday coverage), Forest Hill Station, 19th & Holloway. Those marked with an asterisk are now permanent fixed posts due to reassessment of fixed posts after this program ended.

I do not have specific figures from Inspectors reports to show the improvement in the on-time performance during this period. Traffic checks were made by the Schedule Department during this period and I believe those results should be available for review.

I can tell you that the *perception* among my Inspectors, transit operators and those members of the public that we had occasion to talk with was that service reliability was vastly improved on the lines for which new posts were in place. Operators who try to do the job right were very happy to see more Inspectors monitoring the lines. Conversely, the few that don't want to do it right were unhappy because of the general presence of Inspectors and, in more severe cases, the suspensions without pay they received due to violation reports submitted by these Inspectors for failure to obey the rules.

Appendix 1.5.1
MUNI Metro Station Agent
Unusual Occurrence Report

Station	Date and Time of Incident	Primary or Secondary Booth	Description
Montgomery	February 26, 1996 4:40 p.m.	Secondary	Adult patron ticketed by undercover policy officer for using a youth ticket.
West Portal	February 24, 1996 10:28 p.m.		Hand set missing from white courtesy phone.
Powell	February 22, 1996 10:35 a.m.	Secondary	Patron reported that the fare gate did not eject her fare pass.
Powell	February 22, 1996 2:30 p.m.		Patron upset because she had to wait while station attendant, who had just arrived at the fare booth, had to clear the coin receivers of paper and can tabs.
Powell	February 21, 1996		Several citations issued in separate incidents involving misuse of a youth pass.
Civic Center	February 21, 1996		Several citations issued in separate incidents involving misuse of a youth pass.
West Portal	February 19, 1996 8:40 a.m.		Change machine out of service. Patron received only $1.75 in change after inserting a $5 bill.
Civic Center	February 17, 1996 1:15 p.m.	Secondary	Washer inserted in Fare Gate caused it to jam.
West Portal	February 15, 1996 11:05 a.m.	N/A	Change machine out of service.

Appendix 1.5.1
MUNI Metro Station Agent Unusual Occurrence Report

Station	Date and Time of Incident	Primary or Secondary Booth	Description
Civic Center	March 25, 1996 4:45 a.m.	Secondary	The lid on the revenue end of Fare Gate #3 was unlocked.
Montgomery	March 24, 1996 1:00 p.m.	Secondary	Money was backed up in Fare Gate #3 caused by pieces of paper and a chain in the coin receiver. Gate #2 not locked down. Gate #2 had been unplugged and can tabs had been inserted in the coin receiver.
Civic Center	March 19, 1996 4:55 a.m.	Secondary	Fare Gate #3 jammed with can tabs.
Montgomery	March 18, 1996 4:45 a.m.	Secondary	Several pieces of paper and can tabs in Fare Gate numbers three and four.
Montgomery	March 18, 1996 5:00 a.m.		Top of Fare Gate #2 was unlocked on the revenue side.
Church	March 17, 1996 7:50 a.m.		Missing screws in the Fare Gate door.
Civic Center	March 14, 1996 4:45 a.m.		Can tabs retrieved from Fare Gate numbers one and three.
Montgomery	March 10, 1996 2:30 p.m.	Secondary	Coin slot jammed with paper and gate not locked down.
Montgomery Embarcadero	March 5, 1996 Approximately 3:00 a.m.	Secondaries	A regular Muni patron reported that he had observed a person opening Fare Gate boxes at the Montgomery secondary station. The patron followed the man to the Embarcadero Station where he observed him opening fare gate boxes at the secondary booth station.

Appendix 2.1.1

SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF. 94115 415-673-6864

March 31, 1993

SPECIAL DUTY

In the operating divisions of Woods, Potrero and Kirkland there will be two full-time Special Duty people each. All the other divisions will be permitted one Special Duty full-time person each day.

Any additional Special Duty assignments shall be approved by the General Superintendent, Division Operations without exception. These additional assignments may require operation of transit equipment as needed

All Special Duty operators will wear uniforms.

THIS WILL BE IN EFFECT FOR ONE YEAR AND WILL BE REVIEWED AGAIN AT THAT TIME.

Bobbie L Br

BOBBIE L. BROWN, PRESIDENT, TWU LOCAL 250A

Johnny B Stein

JOHNNY B. STEIN, GENERAL MANAGER
SAN FRANCISCO MUNICIPAL RAILWAY

Kathy Gilbert

KATHY GILBERT, DEPUTY GENERAL MANAGER AND
CHIEF TRANSPORTATION OFFICER

JBS:pm/6640G

GUIDELINES FOR SELECTING SPECIAL DUTY OPERATORS

Special Duty Operators are selected in the following manner:

> When there is a need in the Unit for a secretary, clerk, or other clerical staff, the Superintendent asks the Dispatcher to recommend an operator who has a good attendance record, conscientious work habits, suitable clerical skills, *and* knowledge of the unit. After receiving several recommendations, the Superintendent conducts interviews and selects an operator who meets the following criteria:

- Clerical Skills
- Trustworthy
- Discreet
- Able to work in an office environment with other Supervisory Staff

Although there is no established procedure for selecting Special Duty Operators, these are the guidelines that are followed.

March 26, 1996
LNJ:sw

DON'T IDLE YOUR PROFITS AWAY!

by

Sarah J. LaBelle

October 1986

Center for Transportation Research

Energy and Environmental Systems Division
ARGONNE NATIONAL LABORATORY

work sponsored by

U.S. DEPARTMENT OF ENERGY
Assistant Secretary for Conservation and Renewable Energy
Office of Transportation Systems

Foreword

As part of continuing programs to identify opportunities for energy conservation in freight transportation, the Center for Transportation Research at Argonne National Laboratory analyzed the costs of engine idling by tractor-trailers in fleets of less than 50 tractors. While some large intercity truck companies have implemented cost-effective energy-saving practices, many smaller firms have not been taking advantage of these opportunities. The following report highlights the opportunities for energy and cost savings suitable for smaller fleets.

Two other publications on freight energy savings are available from the Center for Transportation Research. *A Summary of Truck Fuel-Saving Measures Developed with Industry Participation* (Argonne Report ANL/CNSV-TM-135) describes a variety of options for saving fuel, and a brochure, *Energy Efficiency in Trucking: Industry Success Stories,* describes how eight companies improved fuel efficiency. To obtain copies or more information, contact Larry R. Johnson at (312) 972-5633.

DON'T IDLE YOUR PROFITS AWAY!

by

Sarah J. LaBelle

Most tractor-trailers used for intercity hauling are in smaller fleets (less than 50 tractors). In fact, half of these are in fleets of only 2-5 tractors.[1,2] Are these smaller firms getting the best return on their dollar, or do they idle profits away?

Though excessive idling can waste the trucker's operating dollars, this practice is still widespread. If a driver idles an engine an average of three hours per working day, 792 gal/yr of diesel fuel ($911 at $1.15/gal) are wasted by each truck (assuming that the engine consumes 1 gal/hr while idling). If a driver idles an engine an average of eight hours per working day, fuel waste increases to 2,112 gal/yr ($2,429 at $1.15/gal). For a truck that consumes more fuel while idling (2 gal/hr), the cost would double. Even with the low diesel prices of 1986 (80¢/gal), average daily idling of three hours costs $1,267 in wasted fuel for a year.

Considering all of the tractors in fleets of less than 50, 4-12% of their diesel fuel may be wasted — *117 to 391 million* gallons in a year.

No Need to Idle

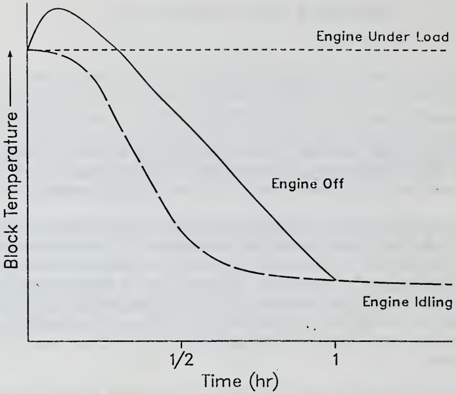
The point of all these calculations is that there is almost no need to idle a heavy-duty engine. Except for a three- to five-minute period after a long haul, idling is unnecessary and can *harm* the engine.

Many reasons are put forward by truck drivers as to why they leave the engine running: to keep the cab heated or cooled, to keep the fuel warm in the winter, to keep the engine warm in the winter to ease start-up, or because all the other drivers do it. What is the other side of the story?

First, in winter, idling cools the engine *faster* than if it were shut off. Why? Because the cooling fans are running. As the engine block is being cooled by the fans, the diesel fuel lines will be cooling also. Figure 1 shows that an idling engine is actually colder than a shut-off engine during the first hour, at 19°F.[3]

Second, for short stops like lunch, it is very expensive to heat or cool the cab, especially if the cab heater or air conditioner runs from the engine. The diesel fuel used for just one hour of idling each day is 264 gal/yr; Table 1 shows how rapidly that figure increases with longer idling. For longer stops like overnight, cab heating or cooling may be necessary, but can be accomplished more cost-effectively than by idling the engine — some alternatives are presented below.

Third, idling damages the engine. Damage comes from deposits of carbon on valves or pistons, degradation of engine oil, and accumulation of water and sulfur in the



Note: Even in winter, the temperature of a stopped engine is equal to that of an idling engine after one hour.

FIGURE 1 Diesel Engine Cooldown in Winter at 19°F (Source: Adapted from Ref. 3)

TABLE 1 Amount of Fuel Used Annually by an Idling Tractor

	Fuel Use (gal/yr)				
	Hours of Idling/Day, Year Round[a]				
Idling Fuel Flow (gal/hr)	1	3	5	8	10 Hours of Idling/Day, Winter Only[b]
0.5	132	396	660	1,056	440
1.0	264	792	1,320	2,112	880
1.5	396	1,188	1,980	3,168	1,320
2.0	528	1,584	2,640	4,224	1,760

[a] Year round = 264 days.

[b] Winter only = 88 days.

engine. All of the damage is related to the low temperature reached in an idling engine, which is at least 10° lower than the 175°F lower limit on efficient engine operation. At temperatures of 165°F or lower, water vapor condenses in the crankcase; when the vapor mixes with the sulfur oxides produced by combustion, sulfuric acid is formed. Engine oils contain alkaline additives to neutralize this acid, but idling consumes them. This degradation of oil during idling is as severe as operation under load, at highway speeds. Some research has shown that degradation during idling is twice as bad — or that one hour of idling is like two hours of driving (or 80-120 mi); that is, wear rates are doubled.[4,5,6]

Put simply, if the engine is not idled, it does not wear. Each hour of avoided idling delays the day when an engine overhaul is required. A year's worth of idling for a typical situation (800 hr at idle) is equivalent to 64,000 mi of on-road driving, assuming 80 mi of wear per hour of idling. That year's worth of idling requires an engine overhaul six months to one year sooner than otherwise.

The case against idling is strong, but so is the case for reliable start-up, free-flowing fuel, and a comfortable cab or sleeper for overnight rests. There are better ways to meet those needs than to idle the engine. None are free, of course, but their costs can be compared to the costs of idling. For winter, the options include fuel heaters using resistance heat or heat from engine coolant,[7] engine block heaters, and cab or sleeper heaters. In the summer, cab or sleeper air conditioners that are not powered by the main engine can be used. An idling timer can be useful all year, by guaranteeing necessary idle operation after ignition shut-down and automatically cutting off the idle after five minutes. Several common devices for fuel heating, space heating and cooling, and idle control are identified, with their manufacturers and average list prices, in Table 2.

Paybacks

Table 3 shows that all of the options described above will pay back their purchase costs through fuel savings in one year or less. Some systems have three-year warranties that virtually guarantee two more years of savings. The cost of operating these devices may decrease the savings, but paybacks would still be close to one year. For example, a fuel heater uses only 5-10% as much diesel fuel as an idling engine.[7]

The alternatives presented in Tables 3 and 4 are designed to match several possible situations for tractor-trailer operations ranging from deliveries in a small service area where daytime idling during lunch and deliveries is the main concern (group 1) to extended over-the-road travel in cold climates when drivers use the sleeper rather than a motel (group 5). The assumptions for the calculations were that diesel fuel costs $1.15/gal and that a blend of No. 1 and No. 2 fuels (for winter driving) costs 2.5¢/gal more than No. 2 fuel alone. The assumptions for the calculations for groups 2, 4, and 5 were that using No. 2 fuel alone increases fuel economy by 5% and that additives for winter, costing $8 per tankful, were unnecessary. The savings for groups 1 and 3 were entirely from reduced idling, which was conservatively assumed to burn fuel at a rate of 1 gal/hr. A year's worth of truck operation is assumed to range from 60,000 to 120,000 mi. The amount of savings that benefit the owners and operators who use these alternatives to engine idling will vary depending on fuel prices, annual mileage, and the amount of idling avoided.

TABLE 2 Alternatives to Diesel Engine Idling

Function	Device and Manufacturer	Energy Source	Purchase Cost (1985 $)
Automatic idle control	Mechanical or electronic timer wired to ignition (Henke Idler)	Battery	24-40
Fuel heating	Resistance and coolant heater (Stanadyne)	Battery and engine coolant	180-230
	Resistance heater (Dynacraft)	Battery	286-347
Engine heating	Engine block resistance heater (Many manufacturers)	External electricity	40
Space heating and cooling	Liquid-fuel heater (Espar)	Diesel fuel	584
	Liquid-fuel heater and electronic air conditioner (Truckers Comfort)	Diesel fuel and/or external electricity	1,500

Source: Manufacturers' publications and personal communications with the suppliers.

Further benefits from decreased idling will add to those savings. Table 4 shows two measures of the benefits of reduced idling: in miles of operation before the next engine overhaul and in dollars as those extra "miles" become maintenance costs avoided (at 1.5¢/mi). From any point of view, idling increases costs because of unnecessary fuel use and premature engine overhauls.

How to Stop Idling

Fleet managers and owners are highly motivated to save money by eliminating unnecessary idling. But what about the drivers? In a small firm, it is probably easier to motivate drivers than in a large firm, because it is relatively easy for each driver to see the effect of his or her excess fuel use on the company's bottom line. For owner-operators, the dollars saved go right into their pocket, which is the best motivation.

TABLE 3 Costs and Benefits of Reduced Idling

Alternatives		Approximate Purchase Cost (1985 $)	Annual Benefits	
Group	Device(s)		Description	1985 $
1	Idle control timer	40	1/3 less idling[a]	303
2	Idle control timer Fuel heater	390	1/3 less idling, higher mpg, no additives, No. 2 fuel only[b]	900
3	Space heater	585	2/3 less idling	606
4	Idle control timer Fuel heater Space heater	975	3 hr/day less idling, higher mpg, no additives, No. 2 fuel only	1,280
5	Idle control timer Fuel heater Space heater/cooler	1,890	8 hr/day less idling, higher mpg, no additives, No. 2 fuel only	2,115

[a] Assuming that lunch time and other short stops no longer require idling.

[b] Use of fuel heater eliminates need for additives to lower fuel's pour point.

The first step for any individual or firm trying to lower fuel costs is good record-keeping for each driver. Keep track of the odometer readings and fuel and additive purchases. Calculate fuel economy *at least monthly* or every pay period, for each driver. If one driver always uses the same tractor, it is very simple to compute that driver's fuel economy. If several drivers use the same tractor in a month, record the miles by driver and calculate fuel economy for each using the corresponding fuel purchases. By calculating the fuel economy for each driver, you can establish the basis for sharing part of the savings. Drivers who have fuel economy above the expected minimum level are rewarded, but those who operate at or below the minimum are not. The size of the incentive can be related to the amount of savings (e.g., a driver who achieved 7 mpg could receive double the reward of one who achieved 6 mpg, in a fleet where 5 mpg is the expected minimum).

Conclusion

Don't idle your profits away -- there is an alternative to wasted fuel and premature engine overhaul.

TABLE 4 Engine Wear Savings per Year from Reduced Idling

Alternatives		Annual Engine Wear Avoided	
Group	Device(s)	Equivalent Miles[a]	Maintenance Cost[b]
1	Idle control timer	21,300	320
2	Idle control timer Fuel heater	21,300	320
3	Space heater	42,600	639
4	Idle control timer Fuel heater Space heater	64,000	960
5	Idle control timer Fuel heater Space heater/cooler	105,600	1,584

[a] Calculated as 80 mi equivalent road use per hour of avoided idling (twice the effect of actual road use).

[b] At 1.5¢/mi maintenance cost.

Notes on National Diesel Fuel Use Calculations

This section outlines the calculations that were used in this report to determine the amount of diesel fuel used by intercity Class 8 tractor-trailers. When this report was written, the *1977 Truck Inventory and Use Survey*[1] was available for estimating the size of the truck fleet; intercity truck fuel use was estimated for 1977 and 1980.[2] *Intercity* refers to trucks that have a typical service range greater than 200 mi. In 1977, there were 209,821 intercity trucks, and 148,109 intercity trucks (70.6 %) were in fleets of less than 50. The share of intercity trucks in small fleets was assumed to be constant from 1977 to 1980. The fuel use values are given in Table 5.

TABLE 5 Diesel Fuel Use by Intercity Trucks

Category	Diesel Fuel Use (10^9 gal) 1977	Diesel Fuel Use (10^9 gal) 1980
National total	13.98	13.78
Intercity trucks (% of total)	4.28[a] (34.5)	5.05[b] (36.7)
Intercity trucks in fleets < 50	3.40	3.56

[a] Energy content of 0.669 quadrillion Btu.

[b] Energy content of 0.701 quadrillion Btu.

References

1. *1977 Truck Inventory and Use Survey*, U.S. Bureau of the Census, revised public use tapes.

2. Millar, M., et al., *Baseline Projections of Transportation Energy Consumption by Mode: 1981 Update*, Argonne National Laboratory Report ANL/CNSV-28 (April 1982).

3. *Truck Save*, brochure, Ontario Ministeries of Energy and Transportation/ Communications, Ottawa, Ontario (undated).

4. *Truck Engine News*, Caterpillar (May 19 and Oct. 27, 1982).

5. Windsor, J., *Idling Trucks: An Outrageous Waste*, Commercial Car Journal, Chilton's (Sept. 1979).

6. Lyons, R., Preston Trucking Co., Preston, Md., personal communication (July-Aug. 1985).

7. Richards, P., *Diesel Fuel Heaters - Fighting the Big Chill*, Commercial Carrier Journal, Chilton's (Aug. 1985).

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COST ANALYSIS

Of the 102 parts listed for repairing & overhauling Lift-U – Series 9032 & 2033 wheel chair lifts, 54 of them could be obtained through Alternate Vendors or rebuilt/fabricated by MUNI and/or Alternate Vendors, with standards that meet or exceed OEM (Original Equipment Manufacturer) specifications. Only 2 of the 54 items found available from sources other than Lift-U, had a higher cost, and one of those two (a switch) represents an upgraded version that is rebuildable.

Substantial cost reductions were revealed, such as an *Idler Gear Assembly* that Lift-U of Escalon, Ca. sells for $30.93, that can be purchased from Bearing Engineering of San Francisco for $10.60.

The highest potential for conserving expenditures was in fabricating components from materials such as Nylatron, silicon impregnated brass, sheet metal and hydraulic pressure line. This report is not just a speculative breakdown, production of wear blocks have already taken place. MUNI personnel acquired the proper stock, and with assistance from Metro and Cable Car Divisions, fashioned it to required OEM specifications.

This research reviewed only 280 of the 550 Lift-U – Wheel Chair Lift systems that MUNI operates. Further investigations will inevitably disclose similar savings.

Section summaries:

Preferred Vendors

Local firms that carry OEM quality replacement parts for Lift-U Wheel Chair Lift assemblies.

Sections One thru Thirteen

Part description and stock level for repair and overhaul. Lift-U, Alternate Vendor and/or MUNI, part numbers & prices.

Cost Analysis Table - C

Price differential and mathematical averages for Sections One thru Thirteen, comparing Lift-U & Alternate Vendor – new parts only. Adjusted for stock required.

Cost Analysis Table - B

Price differential and mathematical averages for Sections One thru Thirteen comparing Lift-U new parts versus MUNI and/or Alternate Vendor fabricated, or rebuilt. Adjusted for stock required.

Cost Analysis Table - A

Combined mathematical averages from Tables-B & C, along with estimates of potential savings.

COST ANALYSIS

Table – A

	LIFT-U	MUNI and/or ALTERNATE VENDOR	STOCK REQUIRED	POTENTIAL SAVINGS
TABLE – B data – 1	$277 average new component price • not influenced by quantity ordered •	$76 average fabricated or rebuilt component price •meets or exceeds OEM quality / performance•	42 components per wheel chair lift overhaul	$171 – per component average savings when using MUNI and/or ALTERNATE VENDORS fabricated or rebuilds, Instead of LIFT-U
TABLE – B data – 2	total – $8,324 for 24 new components	total – $2,270 for 24 fabricated or rebuilt components	42 components per wheel chair lift overhaul	$7,204 – per wheel chair lift overhaul

	LIFT-U	ALTERNATE VENDOR	STOCK REQUIRED	POTENTIAL SAVINGS
TABLE – C data – 1	$39 average new component price • not Influenced by quantity ordered •	$22 average new component price / single item cost • meets or exceeds OEM quality/performance •	71 components per wheel chair lift overhaul	$9 – per component average savings when using ALTERNATE VENDORS instead of LIFT-U
TABLE – C data – 1	total – $946 for 30 new components	total – $523 for 30 new components	71 components per wheel chair lift overhaul	$646 – per wheel chair lift overhaul

	LIFT-U	MUNI and/or ALTERNATE VENDOR	STOCK REQUIRED	POTENTIAL SAVINGS
TABLES B & C COMBINED data – 1	**$172** avg. new component price • not influenced by quantity ordered •	**$52** avg. new, fabricated or rebuilt component price • meets or exceeds OEM quality/performance •	**113** components per wheel chair lift overhaul	**$69 savings** **per component** average savings when using MUNI and/or ALTERNATE VENDOR new, fabricated or rebuilds Instead of LIFT-U
TABLES B & C COMBINED data – 2	**$9,270** for 54 new components • not influenced by quantity ordered •	**$2,794** for 54 new, fabricated or rebuilt components • meets or exceeds OEM quality/performance •	**113** components per wheel chair lift overhaul	**$7,850 savings** **per wheel chair lift overhaul** There are 550 Wheel Chair Lift units installed in MUNI Buses and Trackless Trolleys. This report covers only 280 of those units, Lift-U Series – 9032 & 2033. **$7,850 x 280 = $2,198,000**

COST ANALYSIS

Table – B

LIFT- U new component price •not influenced by quantity ordered•	**MUNI and/or ALTERNATE VENDOR** fabricated or rebuilt component price •meets or exceeds OEM quality / performance•	**STOCK REQUIRED** per wheel chair lift overhaul	**TOTAL SAVINGS** LIFT-U price minus MUNI and/or ALTERNATE VENDOR price times STOCK REQUIRED
80.43	6.50	4	295.72
75.59	6.50	2	140.18
54.40	15.00	2	78.80
10.95	4.00	2	13.90
10.31	2.00	4	33.24
43.08	12.00	1	31.08
43.08	12.00	1	31.08
585.00	283.00	2	604.00
248.00	103.71	1	144.29
1,049.06	120.00	1	929.06
1,049.06	120.00	1	929.06
549.42	120.00	2	898.84
361.41	200.00	1	161.41
243.42	100.00	1	143.32
669.90	90.00	1	579.90
669.90	90.00	1	579.90
1,575.22	653.55	1	921.67
53.72	22.25	1	31.47
47.34	19.66	1	27.68
30.65	19.06	1	11.59
30.65	19.06	1	11.59
73.08	26.34	1	46.74
76.63	27.26	1	49.37
70.79	25.72	1	45.07
28.87	14.53	2	28.68
36.31	17.43	1	18.88
31.83	16.67	1	15.16
36.31	17.53	1	18.78
34.70	16.64	1	18.06
455.36	90.00	1	365.36
total – $8,324.37	total – $2,270.41	total – 42	total savings – $7,203.88
$277.48 LIFT-U average new component price	**$75.68** MUNI and/or ALTERNATE VENDOR average fabricated / rebuilt component price	**42** components needed per wheel chair lift overhaul	**$171.52** average saving per component if MUNI and/or ALTERNATE VENDOR fabricated or rebuilds are used instead of LIFT-U

COST ANALYSIS

Table – C

LIFT-U new component price •not influenced by quantity ordered•	**ALTERNATE VENDOR** new part / individual purchase /component price •meets or exceeds OEM quality / performance•	**STOCK REQUIRED** per wheel chair lift overhaul	**TOTAL SAVINGS** LIFT-U price minus ALTERNATE VENDOR price times Stock Required
4.57	1.63	4	11.76
5.72	2.35	4	13.48
6.36	1.36	4	20.00
2.22	1.81	1	.41
24.62	17.47	2	14.30
46.07	31.20	4	59.48
30.04	26.14	2	7.80
7.54	6.95	4	2.36
9.79	7.78	8	16.08
34.78	7.19	2	55.18
28.19	24.70	2	6.98
30.93	10.60	2	40.66
17.65	4.21	2	26.88
41.37	12.35	2	58.04
.89	.49	4	1.60
52.98	20.11	1	32.87
41.50	8.81	1	32.69
385.19	176.00	1	209.19
82.54	84.00*	5	-7.30
14.21	10.10	5	20.55
32.71	23.30	1	9.41
19.09	25.64	1	-6.55
15.10	10.86	4	16.96
11.94	8.42	1	3.52
total – $946.00	total – $523.47	total – 71	total – $646.35
$39.41 LIFT-U average new component price	**$21.81** ALTERNATE VENDOR average new component price	**71** components needed per wheel chair lift overhaul	**$9.10** average savings per new component if ALTERNATE VENDORS are used instead of LIFT-U

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Platform Operator Work Rule Comparison

	Work Rule Surveyed	MUNI San Francisco	SCCTD Santa Clara	TRI-MET Portland	PAT Pittsburg	MARTA Atlanta	MTA Baltimore	Seattle-Metro. Seattle	WAMTA Washington DC	MBTA Boston	SEPTA Philadelphia	LACMTA Los Angeles
1	Limit on Part-Time Operators:											
	Percentage Allowed	12%	10%	24%	0%	29.165%	15%	49.9%			N/A	15%
	Number Allowed	220			0				20	60	N/A	
2	Requirement to Schedule Saturday and Sunday as Days Off	650	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Spread Time Overtime Penalty											
	Paid @ 150% after ___ Hour:Min	10:00	10:30	12:00	10:30 (1)	11:00	10:30	10:30	10:00	10:00	10:30	11:40
	Paid @ 200% after ___ Hour:Min	N/A	11:00				12:00		11:00			
4	Maximum Scheduled Time Per Day (Spread Time In Hour:Min)	12:00	12:00 (2)	N/A	12:30	N/A	N/A	12:30	14:00	11:00 (3)	12:30	14:00
5	Number of Months Driving To Reach Maximum Salary	18	30	30	36	24 (4)	36	36	36	36	30	42/48 (5)
6	Limitation on Driving Time:											
	Without Some Break ___ Hour:Min	None	None	None	5:30	None	6:00	None				None
	Paid Lunch Break After ___ Hour:Min	5:59	None	None	None	None	None	None	Yes?	6:00	6:00	None
	Rate For Paid Lunch Break	20 Min.							25 Min.	23 Min.	15 Min.	
	Unpaid Lunch Breaks	None	None	None	Yes	None	None	None	Yes	Yes	None	None

(1) 10% allowed at each division without spread penalty.
(2) Maximun spread of 12:15 is allowed for frag runs.
(3) Maximum spread of 13:00 is allowed for thirty operators.
(4) All operaters are hired as part-time (presently approximately 36 months duration)
(5) Depending on date of employment.

Appendix 7.1.1

MUNI SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF. 94115 415-673-6864

August 1, 1986

SIDE LETTER AGREEMENT: PRIVATIZATION

Public Utilities Commission policy regarding privatization of Municipal Railway transit service adopted in Resolution 86-0103 March 25, 1986 is as follows:

The Public Utilities Commission reaffirms its commitment to maintain the most cost effective means of providing transportation and transportation related services, specifically to include fair and adequate consideration of the private enterprise providers' role therein.

The Public Utilities Commission continues the policy of seeking and considering the widest possible range of public input and comment, especially from private sector providers, in the planning and decision making process.

In furtherance of these goals, the Public Utilities Commission hereby directs the staff to:

a) Further develop a model of the "full costs" of transportation and transportation related services now being provided by the Municipal Railway in order to provide an improved method of making valid cost comparisons between the costs of Municipal Railway provided services and the costs of providing these services through private sector providers who have the capability of doing so.

b) Review the process of soliciting private sector input into the planning and decision making of the Public Utilities Commission with respect to the Municipal Railway and to eliminate any constraints to such input as may exist.

c) Establish, with the approval of the commission, a fair and effective means of resolving the complaints of any private sector provider who believes that private sector opportunities to reduce cost while maintaining service levels and fare structures have not been fairly or adequately considered by the Public Utilitities Commission or staff.

The Commission has at various times executed 13 (c) agreements in connection with UMTA grants. The Commission will adhere to the terms of such agreements, including terms relating to the rights of employees and their Union, which may be involved in the process of considering the privatization of Municipal Railway transit service. Local 250A will be informed whenever an issue involving 13 (c) agreements of which it is a party is under active review.

Samuel W. Walker
muel W. Walker, President
Transport Workers Union
Local 250A

William G. Stead
General Manager
San Francisco Municipal Railway

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SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF 94115 415-673-6864

July 9, 1996

TO: HARVEY ROSE
Budget Analyst

FROM: EMILIO R. CRUZ
Director of Public Transportation

SUBJECT: **RESPONSE TO THE DRAFT MANAGEMENT AUDIT**

We have reviewed the factual content of the Draft Management Audit and provided you with the necessary documentation to resolve some of the factual issues that were discussed at the exit conference. We also understand the process and the methods that were used by you and your staff to develop the audit findings and recommendations.

However, given my recent appointment as the Director of Public Transportation, I will be unable to transmit my written responses to the substantive recommendations made in your audit until I have had sufficient time to review the findings and discuss responses with the Deputy Directors. I am aware you must release the audit without my department's response in order to meet the deadline imposed by the Proposition J compliance requirement. Please be advised I will provide my responses to you and the Public Transportation Commission as soon as possible.

Your efforts to assist me in evaluating and improving the Municipal Railway are greatly appreciated. I look forward to working with you in the upcoming phases of the audit process.

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